CONTAMINATED SEDIMENTS

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HEARINGS

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES

OF THE

COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION HOUSE OF REPRESENTATIVES

ONE HUNDRED FIRST CONGRESS

SECOND SESSION

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CONTENTS

Page

Proceedings of:
May 15, 1990 1
May 16, 1990 31

TESTIMONY

Caggiano, Frank, assistant director, port development, Port Authority of New York & New Jersey, accompanied by David Berkovits, supervising harbor planner, port department 72
Clark, Sarah, staff scientist, Environmental Defense Fund 57
Dickey, Edward D., Ph.D., Acting Principal Deputy Assistant Secretary of the Army (Civil Works), U.S. Army Corps of Engineers, accompanied by Robert Engler, Senior Scientist and Manager of Environmental Effects of Dredging Programs, Environmental Laboratory, U.S. Army Waterways Experiment Station, Vicksburg, MS 5
Dusseau, Charles, Commissioner, Metropolitan Dade County, FL 32
Hulsey, contaminated sediments specialist, midwest office, Sierra Club 57
Kamlet, Kenneth S., Chairman, Committee on Contaminated Marine Sediments, Marine Board, National Academy of Sciences 24
Lehman, Hon. William, a Representative in Congress from Florida 32
Matuszeski, William, Associate Administrator for Water, U.S. Environmental Protection Agency, accompanied by Elizabeth Southerland, Director, task force, on fish and sediment contamination, Craig Vogt, Director, Marine Operations Division, Office of Marine and Estuarine Protection, and Kirk Stark, Regulatory Activities Division, Office of Wetlands Protection 5
Millemann, Beth, executive director, Coast Alliance 57
Pallone, Hon. Frank, a Representative in Congress from New Jersey 51
Ros-Lehtinen, Hon. Ileana, a Representative in Congress from Florida, accompanied by Charles Dusseau, Commissioner, Metropolitan Dade County 32
Sickles, Mark, president, National Association of Dredging Contractors 72
Stromberg, Erik, president, American Association of Port Authorities 72

PREPARED STATEMENT SUBMITTED BY MEMBERS OF CONGRESS

Hammerschmidt, Hon. John Paul, a Representative in Congress from Arkansas 2
Stangeland, Hon. Arlan, a Representative in Congress from Minnesota 2

PREPARED STATEMENTS OF WITNESSES

Caggiano, Frank N 86
Clark, Sarah L 90
Dickey, G. Edward, Ph.D 102
Dusseau, Charles 114
Hulsey, Brett D 117
Kamlet, Kenneth S 127
Lehman, Hon. William 41
Matuszeski, William 138
Milleman, Beth 197
Pallone, Hon. Frank 54
Ros-Lehtinen, Hon. Ileana 42
Sickles, Mark D 217
Stromberg, Erik 221

SUBMISSIONS FOR THE RECORD

Matuszeski, William, Associate Administrator for Water, U.S. Environmental Protection Agency: Page

- "Chesapeake Bay—A Success Story in Estuarine Management" 157
- 1987 Chesapeake Bay Agreement 159
- Chesapeake Bay Program organizational chart 170
- "The Chesapeake Bay Program: A Commitment Renewed." Restoration progress and the course ahead under the 1987 agreement (A report of the Chesapeake Implementation Committee, February 1988) 179
- Second annual report under the Chesapeake Bay Agreement (Chesapeake Executive Council, February 1987) ..... *
- "Saving Bays and Estuaries—A Primer for Establishing and Managing Estuary Projects," U.S. E.P.A. Office of Water, EPA/503/8-89-001, August 1989 ..... *

*Retained in subcommittee files.

CONTAMINATED SEDIMENTS

TUESDAY, MAY 15, 1990

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON WATER RESOURCES,
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION,
Washington, DC.

The subcommittee met, pursuant to call, at 10 a.m., in room 2167, Rayburn House Office Building, Hon. Henry J. Nowak (chairman of the subcommittee) presiding.

Mr. NOWAK. The subcommittee will come to order.

This morning, the Subcommittee on Water Resources meets to receive testimony on issues related to contaminated sediments. The pollution of lake, river and harbor bottom sediments is a problem of increasing concern throughout the United States.

A recent report by the National Academy of Sciences reports that sediment contamination is widespread throughout the U.S. coastal waters and potentially far-reaching in its environmental and public health significance.

Although the National Academy of Sciences study focuses just on marine waters, recent EPA studies indicate that virtually all harbors contained contaminated sediments or in-place pollutants. The sources of contamination are as varied as those affecting surface waters—urban and agricultural runoffs, municipal discharges and even atmospheric discharges.

The sediment quality is addressed by several laws. The Clean Water Act gives EPA responsibility for safeguarding the quality of the U.S. Coastal and inland waters and sediments. The Clean Water Act and the Ocean Dumping Act mandate EPA and the Corps to oversee dredging and disposal activities.

EPA carries out Federal responsibilities required under the Superfund for ensuring cleanup of inactive or abandoned hazardous waste sites, including underwater sites.

The subcommittee has had several hearings over the last few years on contaminated sediment issues. Today's hearings will focus on the status of the current programs and proposed legislative options for restoring and protecting the quality of sediments.

I am pleased to have testifying before us today representatives of Federal agencies involved in much of the sediment research and protection efforts, Mr. Matuszeski of the EPA and Dr. Dickey of the Corps of Engineers. We welcome their expertise, and also the expertise provided by Mr. Kenneth Kamlet, the Chair of the Committee of the National Academy of Sciences which just published its major analysis of sediment contamination issues.

Before we hear from our first witnesses today, I yield to my distinguished colleague from Minnesota, the ranking Republican member of the subcommittee, Arlan Stangeland, for whatever comments he wishes to make at this time.

Mr. STANGELAND. I thank you very much, Mr. Chairman.

First of all, I would like to ask unanimous consent that a statement by Congressman Hammerschmidt be made a part of the record at this point; and then, Mr. Chairman, I ask that my prepared statement be made a part of the record.

[The statements of Mr. Hammerschmidt and Mr. Stangeland follow:]

STATEMENT OF HON. JOHN PAUL HAMMERSCHMIDT

Thank you Mr. Chairman.

Today, the Water Resources Subcommittee turns once again to the problems posed by contaminated sediments in our inland and coastal waters. In a sense, this is a problem that we have largely inherited as a result of prior environmental abuses. Most of the serious contaminants found in bottom sediments today are a legacy of industrialization in an age before modern point source controls were implemented.

This is not to say that contamination of bottom sediments is no longer a problem. We continue to find new contaminants which are settling on our river and lake bottoms from a variety of sources. We need to continue our efforts to end all sources of contamination to the extent we can. However, we are also faced with the dilemma of what to do with sediments which may have been contaminated decades ago. We must decide whether to leave them in place or to try to remove them and face the problems of resuspension and disposal.

Sometimes we have little or no choice. The need to maintain our system of navigation necessitates removal of contaminated sediments and disposal in a fiscally and environmentally responsible manner.

Today, we will hear from witnesses from the EPA and the Corps—the two Federal agencies most directly involved in this difficult decision making process. We will also hear from a representative of the National Research Council who will describe the findings of a comprehensive study of the contaminated sediments issue undertaken by the National Academy of Sciences. I want to welcome all of our guests and I look forward to their testimony.

STATEMENT OF HON. ARLAN STANGELAND CONTAMINATED SEDIMENTS HEARING
WATER RESOURCES SUBCOMMITTEE MAY 15, 1990

Thank you, Mr. Chairman. Today and tomorrow, the subcommittee meets to review testimony on contaminated sediments in our Nation's coastal and inland waters. This is all part of our continuing series of hearings on water quality issues including, among other things, coastal pollution, coastal zone management, and dredging and disposal of materials in marine and fresh waters.

Pollutants can remain in lakes, harbors and riverbeds for a long time. Toxic chemicals often persist indefinitely in the ecosystem and bioaccumulate in the food chain. Even conventional pollutants may not go away easily, particularly in the Great Lakes—a system which "flushes" itself out very slowly. Because of the slow flushing and the high concentration of populations, the lakes become natural sinks for toxics and other pollutants.

Today's hearing will not focus on conventional pollutants. The household sewage and organic nutrients known by some as "lumps and colors." Instead, we will probe into toxic contaminants such as PCBs, dioxin, and other chemicals. In particular, we will explore problems associated with toxic contaminated river and harbor sludge. We need to know how much pollution has settled on harbor floors and river beds and is contained in dredged material. We should also explore development of toxic sediment criteria, risk assessments, and innovative cleanup technologies.

We need to address the very difficult technical, legal, and policy questions involving cleanup of contaminated bottom sediment. Whether we use the Clean Water Act, the Great Lakes water quality agreement, superfund, or some other authority, cleanup becomes very expensive and complicated. Acceptable disposal sites, such as confined disposal facilities, are not easy to find or maintain. Officials also face difficult decisions about whether to cap or otherwise secure the in-place pollutants or to

remove them and risk further problems. Polluted bottom sediments can be stirred up and resuspended by cleanup efforts, as well as by routine dredging, ship, traffic, wind or wave action, and even fish or other organisms that feed on the bottom of coastal and inland waters.

Whatever we do, we must take into account competing interests. And there are many. The Corps' maintenance dredging program is extremely important to navigation, our overall economy, and national security. We need to address environmental problems involving Corps' activities but we can't afford to jeopardize the entire dredging program. We should explore the Corps' potential opportunities in environmental restoration projects where feasible and prudent to do so.

Obviously, we face serious funding constraints. The Federal Government is not going to have all the resources needed to provide a long-term comprehensive solution. State and local governments will have to continue to play a major role. Even if existing authorities and programs received every dollar authorized, we would still need to see a significant contribution from States and local governments as well as from industries, businesses and citizens. It is only through this cooperative effort that we will see a measured degree of progress.

Mr. Chairman, we face a whole host of new and old problems, not to mention future funding battles. Testimony from our witnesses, however, should help us to find innovative and balanced solutions.

Mr. STANGELAND. In the essence of time, I will not read the whole statement. And then I will have to excuse myself because we are in the Agriculture Committee mark-up on the farm bill, and I must excuse myself from this hearing, unfortunately, because it is a very important hearing.

But, Mr. Inhofe and Ms. Molinari will be sitting in my stead here, and they look forward, I am sure, to the testimony of the administration witnesses and others on a very important matter, something that is very persistent, as you well know, and I think most anyone involved understands the problems of the Great Lakes there.

They are far more severe than any other areas, because of their slow flushing ability and they become sinks for contaminants that lie there for years and years and cause problems.

We also have an area that is very essential in transportation and commerce that requires dredging by the Corps, and those interests have to be balanced, because the concern, the problems of a lack of adequate resources to really write a responsible, long-range solution, but one that must be written, regardless.

I look forward to working with you and your leadership. Thank you.

Mr. NOWAK. Thank you very much.

We will now turn to Jimmy Hayes of Louisiana.

Mr. HAYES. Thank you, Mr. Chairman.

In looking over the memorandum sent out by you and in seeing the summary of the report on contaminated marine sediment remediation, it occurred to me that this was the logical forum to be able to talk about the interrelationship of marine sediment problems as they relate to an estuary system.

The State of Louisiana is the largest wetlands in the world, but it is in effect a circulatory system of water. For many years, it has been carefully scrutinized by EPA because of the activities that were in part legal at the time those discharges were made, in part illegal discharges.

But I am most interested in the word "remediation" and interested in the testimony today, and my questions will relate to the

practicalities of a cleanup in the jurisdiction and the means by which we legislate in order to obtain environmental quality.

I very much want to thank the chairman for giving all of us the opportunity to participate not only in answering specific questions that concern our estuary system, but that affect all of the continental United States and the commerce upon which we have come to rely, because of the ability to grow crops and to harvest seafood products that are a major source of revenue to the Nation, and more importantly, in order to preserve what is an extraordinary work of God, hopefully left unchanged for future generations to enjoy.

Thank you, Mr. Chairman.

Mr. NOWAK. Thank you very much.

Mr. Inhofe, would you care to make a statement?

Mr. INHOFE. Thank you.

I don't have a prepared statement, nor do I have any lengthy discourse on this item. I am very interested, and I know that those witnesses who are here today are probably more aware of the problems that we have in this area. In my State, it is always a surprise to everyone to know that number one, we are navigable all the way to Tulsa, Oklahoma; and, number two, in spite of some arguments you might hear from other members, we actually had more miles of fresh water shoreline than any other State.

We have worked very well with the EPA, very well with the Corps of Engineers, and this is an area that has always held a great deal of interest to me. In the years I have spent as Mayor of the City of Tulsa, we dealt with this issue quite often because of the outlying areas.

So, I look forward to these hearings, and I look forward to resolving some of these problems that are plaguing other states and major cities in our Nation.

Mr. NOWAK. Thank you very much.

We will now turn to Susan Molinari from New York.

Ms. MOLINARI. Thank you, Mr. Chairman.

I also will be brief, but will join with my colleagues in thanking you for bringing this issue in particular to our attention. Since I have been privileged to serve on this subcommittee, we have spent and should spend a considerable amount of time on preventive pollution mechanisms for our waterways; and clearly, what we have to deal with as localities around this Nation is what to do with that which is already contaminated without further exacerbating the situation.

In the New York Bight area, for example, we are dealing with that issue every time we talk about dredge spoils, and with the Army Corps of Engineers in particular with regard to the issue of borrow pits and the question of moving them.

So, I am particularly grateful for the insight that this particular hearing will lend to an area that unfortunately is impacted by contaminants every day and has had a history of pollution that makes today seem almost beneficial.

So, I look forward to the hearing.

Mr. NOWAK. Thank you very much.

We would like to invite the panel up: William Matuszeski, who is the Associate Assistant Administrator for Water for EPA; and also

ask that the U.S. Army Corps of Engineers' representative, Dr. G. Edward Dickey, the Acting Principal Deputy Assistant Secretary of the Army (Civil Works), come forward to the table, and I understand that you will be accompanied by Robert Engler, who is the Senior Scientist and Manager of Environmental Effects of the Dredging Programs, Environmental Laboratory, U.S. Army Engineer Waterways Experiment Station at Vicksburg, Mississippi.

Gentlemen, welcome before the committee. Bill, if you want to move, we will incorporate your statement in the record in its totality, and ask you to proceed as you so desire.

TESTIMONY OF WILLIAM MATUSZESKI, ASSOCIATE ASSISTANT ADMINISTRATOR FOR WATER, ENVIRONMENTAL PROTECTION AGENCY, ACCOMPANIED BY ELIZABETH SOUTHERLAND, DIRECTOR, TASK FORCE ON FISH AND SEDIMENT CONTAMINATION; CRAIG VOGT, DIRECTOR, MARINE OPERATIONS DIVISION, OFFICE OF MARINE AND ESTUARINE PROTECTION; AND KIRK STARK, REGULATORY ACTIVITIES DIVISION, OFFICE OF WETLANDS PROTECTION; DR. G. EDWARD DICKEY, ACTING PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE ARMY (CIVIL WORKS), DEPARTMENT OF THE ARMY, ACCOMPANIED BY ROBERT ENGLER, SENIOR SCIENTIST AND MANAGER OF ENVIRONMENTAL EFFECTS OF DREDGING PROGRAMS, ENVIRONMENTAL LABORATORY, U.S. ARMY CORPS OF ENGINEERS WATERWAYS EXPERIMENT STATION, VICKSBURG, MS

Mr. MATUSZESKI. Thank you.

Good morning Mr. Chairman and members of the subcommittee, I am accompanied at the table here by Elizabeth Southerland, the Director of EPA's Task Force on Fish and Sediment Contamination; Craig Vogt, Director of the Marine Operations Division, Office of Marine and Estuarine Protection; and Kirk Stark, Regulatory Activities Division, Office of Wetlands Protection.

We are pleased to be here today and thank the subcommittee for inviting us to discuss agency activities concerning contaminated sediments.

Mr. Chairman, with your permission, I would like to provide a copy of my full statement for the record and summarize it briefly this morning.

Mr. Chairman, the first issue is the extent of the contaminated sediments problem. It must be stated at the outset that most sediments in the United States, including those dredged for navigation purposes, are not contaminated with toxic materials.

Nonetheless, toxic materials in the sediments at a number of locations in our Nation's waters are causing, or are likely to be causing, unacceptable risks to human health, aquatic life and wildlife.

Human health concerns have prompted a number of States to enact fishing restrictions and seafood consumption advisories in areas of contaminated sediments. More information on this issue will be provided by the NAS panel member, whose Committee on Contaminated Marine Sediments has released its report on assessment and remediation of contaminated marine sediments.

What is EPA doing about contaminated sediment management? There are many different statutes and implementing offices within

EPA that have a role to play in addressing the problem. We have organized a coordinated agency approach under the Sediment Steering Committee, which was formed in 1988. It is responsible for developing an agency-wide strategy.

We expect this strategy to be completed early next year. One of the first problems encountered by the Steering Committee is that to date, no agencies have completed a comprehensive inventory of sites with contaminated sediments.

We believe the most complete inventory covers in the Great Lakes and, as you are well aware, 39 of the 42 areas of concern identified in the Great Lakes have problems with contaminated sediments. Outside of the Great Lakes, systematic information on the extent of this problem is essentially unavailable.

Much of the current work at EPA is focusing on sediment classification methods. In other words, how to distinguish between clean and contaminated sediments. We are trying to develop consistent, scientifically valid approaches upon which there can be general scientific agreement.

Some of the classification methods we are considering are intended to produce numerical, chemical-specific criteria. Other methods produce biological criteria which can be used to determine the toxicity or bioaccumulation potential of chemical mixtures in the sediments.

These chemical-specific or biological sediment criteria are going to play a number of important roles for us in identifying the priorities for contaminated sediment sites, establishing cleanup levels, measuring the effectiveness of cleanup activities, targeting point and non-point sources upstream of contaminated sites, assessing the risks of disposing sediments at various aquatic sites, and monitoring sediment quality.

Developing these sediment criteria is a controversial and complicated process. We must address such issues as sediment contaminant interactions, bio-availability and the variability of sediments in different geographic areas. We have made considerable progress. In the last year the EPA Sediments Technical Committee has developed a Sediment Classification Methods Compendium. It is the first time we brought together in one place 10 different methods currently being considered for developing sediment criteria.

This Compendium is currently under review by EPA's Science Advisory Board which has completed its work on two of the 10 methods. Schedules for developing the actual criteria will have to await the final review of the remaining methods by the Science Advisory Board at the end of this year.

Another EPA focus is on source control and pollution prevention. This is an important part of the contaminated sediment management effort because we need to prevent the continued deposition downstream from point and non-point sources that continue to create problems of contamination in the sediments.

The agencywide sediment management strategy will address setting NPDES permanent limits, as well as non-point source loading targets, to prevent further contamination of sites that we have identified.

At this point, the Environmental Protection Agency is not seeking legislative changes to its Clean Water Act source control pro-

grams. We believe we can use the Clean Water Act authorities and our existing effort to develop criteria in order to accomplish this.

We are also very much concerned with dredge material management along with our colleagues in the Corps of Engineers. Maintenance dredging of navigation channels and harbors occurs in areas of significant net deposition, and these areas very often coincide with the sediment contamination hot spots.

There are a wide array of disposal options under both the CWA and the MPRSA regulatory programs. These disposal options include unrestricted open water disposal, restricted aquatic disposal such as capping of contaminated material with clean material, the use of material for beneficial purposes such as beach nourishment, and placement in a confined disposal facility.

To provide guidance in selecting among these options, EPA and the Corps are working together on a Dredge Material Disposal Strategy Document. This will provide a decisionmaking framework for determining the best option.

In addition to contamination, the strategy is going to look at the physical impacts of the dredge material disposal on aquatic resources and habitat, an issue heretofore that has not always been given full attention. This strategy is going to be completed early next year.

In support of this strategy, we are revising our Ocean Dumping Regulations and the associated testing manual. The new regulations are going to require use of using the updated testing manual, which includes state-of-the-art testing. The last comprehensive revision of the regulations and the testing manual was completed in 1977. Thus, EPA and the Corps have 13 years' experience to put into the new manual to determine the toxicity and bioaccumulation potential of dredged material.

On March 7, EPA and the corps published a notice in the Federal Register announcing the availability of this testing manual for public review. There will be a six-month comment period. We are also considering using this manual as a disposal option manual for section 404 waters in estuarine areas. We are also working with the Corps to develop a testing manual for the evaluation of disposal of dredged material in fresh water and in other areas subject to section 404 authority. This manual will use the same testing framework as the draft manual for ocean disposal.

Finally, Mr. Chairman, there are a number of issues related to the remediation of contaminated sediment. First, it is encouraging that natural recovery has occurred in some areas where the source of contamination has been controlled. This may be the answer in many areas, although it is going to require tight controls on upstream discharges.

An example of this is the natural recovery of the Kepone-contaminated sediments in the James River estuary in Virginia over the last 10 years. The price we paid for that was a ban on fishing during that entire period. If natural recovery is not expected to recur in a reasonable time frame, there are other approaches such as *in situ* containment or capping, which has been used to some extent in the Puget Sound.

With regard to treatment on-site, this is an area of emerging technology, and the environmental community is extremely inter-

ested in its possibilities. Finally, removal and disposal of the contaminated sediments may sometimes be appropriate. Generally, this has been used to maintain navigation channels but not to clean up sediment sites, per se.

We do have Superfund program working in Waukegan Harbor, New Bedford Harbor and several other areas. We believe that a significant number of sites on the National Priorities List may involve contaminated sediments.

We also are at work in the Great Lakes, as you are aware, Mr. Chairman, in the Assessment and Remediation of Contaminated Sediments or ARCS program, which has a series of pilot demonstrations of remediation technology scheduled for 1991.

In addition, the U.S. Army Corps of Engineers and EPA in New Bedford Harbor are working on a pilot program to actually dredge in-place contaminated sediments as part of an expanded navigation channel and maintenance dredging project.

Our Agencywide Sediment Management Strategy will begin to address the question of what a national contaminated sediment remediation program should look like. This will include how we should use our authority under Superfund, the Resource Conservation and Recovery Act, the Toxic Substances Control Act, and section 115 of the Clean Water Act. The strategy will also deal with how to focus resources on high-priority sites.

Mr. Chairman, that concludes my presentation. I would be pleased to answer questions.

Mr. NOWAK. Thank you very much.

We will now turn to Dr. Dickey.

Dr. DICKEY. Thank you very much, Mr. Chairman.

I am pleased to again appear before this committee on behalf of the Department of the Army. Accompanying me today is Dr. Robert Engler, Senior Scientist and Manager of Environmental Effects of Dredging Programs at the Army's Waterways Experiment Station in Vicksburg Mississippi.

With your permission, Mr. Chairman, I will summarize my statement, and ask that my full statement be included in the record.

Mr. NOWAK. Without objection.

Dr. DICKEY. Pursuant to its civil works mission, the Army administers several major programs. Two of these play a critical role in the protection, management and development of our water and related land resources, and which therefore relate to contaminated sediments.

First, the Army's dredging program implements Federal statutes regarding the maintenance of a safe and reliable navigation system within the United States. This Army Corps of Engineers program is indispensable to the development and maintenance of the Nation's extensive system of commercial channels, harbors and ports which in turn is essential to the economic well-being and defense capability of the United States.

Second, the Army operates a regulatory program also through the Army Corps of Engineers. This responsibility includes authority to regulate: One, the discharge of dredged or fill materials into the waters of the United States under section 404 of the Clean Water Act; two, all the work and structures in navigable waters in the United States under section 10 of the Rivers and Harbors Act

of 1899; and three, the transportation of dredged sediments for the purpose of ocean disposal under section 103 of the Marine Protection Research and Sanctuaries Act.

In addition to the work that the corps carries out pursuant to its authorized missions, it also provides engineering, construction management, research and development support on a reimbursable basis to others. The corps is currently assisting other Department of Defense agencies and the Environmental Protection Agency. Since 1987, we have managed the expenditure of over $800 million for cleanup and remediation work at the request of these agencies.

At present, our national dredging program involves removal, disposal and management of about 300 million cubic yards of dredged sediments each year to maintain this Nation's extensive Federal navigation system.

This waterway system includes over 25,000 miles of Congressionally-authorized and Federally-maintained navigation channels, serving 41 of the 50 States. Nationwide, another 100 to 150 million cubic yards of sediments are dredged and disposed of each year under permits issued by the Corps of Engineers.

Only a small fraction of the sediments we dredge each year fall within the category of contaminated to the extent that they require special disposal techniques. While the percentage is small, the actual volumes requiring special handling are still quite large-ranging from 3 to 10 million cubic yards per year.

The corps is not authorized to implement projects involving environmental cleanup dredging, per se. The projects and research activities undertaken by the corps are principally for navigation and flood control purposes.

As you know, a cost-benefit analysis must be performed to determine if sediment removal is economically justified. If the benefits do not exceed the cost, the corps cannot proceed with the project as such—if the work is to be done, another Federal or non-Federal agency must fund the work.

Since 1973, the corps has expended well over $100 million on environmental research and development directly related to its responsibility to maintain and improve navigation and to regulate dredged sediment disposal in a both cost-effective and environmentally safe manner. We see this research commitment as a continuing high-priority requirement due to the complexity of evaluating sediment contamination and the environmental sensitivity of our waterways.

Currently, we are expending about $1.2 million each year on research activities specifically related to contaminated sediments. The corps and the Environmental Protection Agency jointly promulgate the technical assessment and testing protocols for dredged sediments. This is done through established joint technical working groups and joint publication of a testing manual.

Cooperative research is also conducted on the identification, assessment and management of contaminated sediments. These efforts include district and regional offices, research laboratories and appropriate headquarters staff of both agencies.

These technical groups address national issues such as revisions of the ocean dumping manual or regional problems such as dioxin contamination in New Jersey's sediments.

Turning to current legislation that is being considered by the Congress, we note that both Houses of Congress are considering legislative proposals to amend the Clean Water Act and the Marine Protection, Research and Sanctuaries Act. These are being considered in an effort to expand regulation of activities in marine and coastal waters.

I would like to comment in general terms on these legislative proposals on the provisions which we view as scientifically unjustified and, in turn, technically indefensible for the foreseeable future for dredged sediment disposal.

Among other measures, these bills would establish numerical sediment criteria and standards for coastal waters and establish new regulatory strategies for management of dredged sediments which are found to exceed such numerical sediment quality standards.

These provisions, if implemented without appropriate research and coordination, would not afford increased environmental protection, and in some cases, could be less environmentally effective than existing procedures.

It is the Corps' opinion that it is beyond currently available technical knowledge to develop scientifically-based numerical sediment quality standards that embrace adequate knowledge of the cause-and-effect relationships of sediment contaminants.

The geochemical interrelationship of sediments in overlying waters is extremely complex. Presently, it cannot be quantified in a way that relates the concentration of a single chemical or group of chemicals in a sediment matrix of natural and man-made components to an impact of a contaminated sediment.

The conclusion of scientific studies to date has been that the corps and EPA effects-based testing using a broad array of tests is a scientifically valid and defensible approach that can be effectively applied in regulatory decision-making, for proposed dredged material disposal activities.

Mr. Chairman, this concludes my statement. Dr. Engler and I would be happy to respond to your questions.

Mr. NOWAK. Thank you very much.

When we look at legislation, one of the identifiable areas is how we get a total scope of this problem, and to do that, of course, no matter which of the two or three or 10 methods that may be chosen, you first are going to have to take samples, before any active remediation is started, know what is in that bottom sediment.

And you start then looking at, as we do in other areas, where the needs are, what the inventory would be to discover those needs.

I wonder if you could both comment on how extensive the work would be to complete an inventory so that you could start the process.

Mr. MATUSZESKI. I could begin the answer, and I am sure my colleagues can add to it. In response to the various legislative proposals we have seen on this, we have done some in-house work on what such an effort would involve.

It is our estimate that for approximately $2 million and over a period of approximately two years, we could, in cooperation with the corps, pull together an inventory of contaminated sediment

sites nationwide that would be limited to the use of existing information and would not involve actually going out and testing harbors.

If we were to undertake the more extensive approach, with actual field testing to determine the extent of the problem, the cost would be closer to $12 million and the time frame would be closer to five years.

Mr. NOWAK. When you talk in terms of the $2 million, Bill, what would you expect to have at the conclusion of that? What type of an inventory? What stage would you be in to say, if both the scientific and environmental community and EPA agreed upon criteria, could you go in then and start the remediation in those areas?

Mr. MATUSZESKI. That is an excellent question. First of all, we will continue to work on the development of criteria as we complete an inventory. We will have to apply whatever state-of-the-art criteria we have at that point to determine which areas and under what priorities we should seek remediation.

The data base itself, however, under the circumstances that you have established, would be limited to pulling together existing studies and existing information. So, we would still not be sure that, in the case of at least some estuarine areas and some river areas, there were not in fact some additional sites.

Mr. NOWAK. Do the States' DECs, have they accomplished any type of inventory that would be useful within their own jurisdiction? When they rate a stream, the ABCD classifications and so forth, I assume that all the States are doing those kinds of classifications, isn't that true?

Mr. MATUSZESKI. That is correct. They have classified their streams. To a large degree, however, they are classifying those streams according to what they anticipate the future uses will be.

Mr. NOWAK. And that is water quality, not the sediment?

Mr. MATUSZESKI. That is correct. So they are unable to take into account all cases of uptake from sediments into the water and ultimately into the food chain.

Mr. NOWAK. Let me turn from that. There is some problem, I guess, with your going ahead with your two different methods that were frequently looked at, equilibrium partitioning, which I guess relies on more mathematical modeling, or the so-called apparent effects threshold, which relies, I guess, on the actual sampling of the bottom sediment.

Do you view those as exclusive or should not they be somehow combined to provide the best results of both those methods?

Mr. MATUSZESKI. The EPA Scientific Advisory Board in its report on these two methods indicated that there was a basis for using the Equilibrium Partitioning Approach, they felt that there was a basis for using that in coordination with and in conjunction with other methods that they are still looking at.

With respect to the Apparent Effects Threshold (AET), they were more concerned about the methodologies used. It felt that there were more site-specific limitations for AET. The effect was to approve the use of that method in Puget Sound only, but not for other areas until they had further information.

Would you like to add to that?

Ms. SOUTHERLAND. Both the Equilibrium Partitioning and Apparent Effects Threshold measure concentration, so both of them do start with that. But what the Equilibrium Partitioning does is try to back-calculate what the interstitial water concentration would be, so it would meet a water column concentration.

That would be more appropriate, we think, for a national criterion if we could make sure and be able to estimate what fraction of the bulk sediment chemistry was bio-available. In the AET, they make the measurement and then look at some bioassays in that particular area to see if it shows an effect.

It is very site-specific, and you can use both of them together, but it depends on how national versus how site-specific you want your criteria to be.

Mr. MATUSZESKI. I think we are all glad that Dr. Southerland is here today.

Mr. NOWAK. In 1987, there was some type of an inventory taken by EPA relating to, I guess it was called an overview of sediment quality in the United States. What, in addition to that, would you propose be developed for this $2 million?

Mr. MATUSZESKI. With the $2 million, we would undertake to pull together information developed from other scientific studies and that is not limited to EPA-only data, as the 1987 study was. For example, a number of States have undertaken studies and reviews. Some States such as the State of New York have their own Superfund-type efforts underway which have generated a lot of information and data on sediment areas and water bodies.

In addition, we would be looking at the academic community and the information they have been able to pull together as a result of studies that they may have been doing in recent years.

Again, it would be an effort to go beyond the EPA data base and to seek whatever is available from the National Academy, from the academic community, from State governments and other Federal agencies.

Mr. NOWAK. Let me, at this point, turn to Susan Molinari for her questions. We have some other--I am going to keep this record open as we start to fill in, and we will have more questions to you in writing over the next several weeks.

Ms. MOLINARI. Thank you, Mr. Chairman.

I think what I heard Dr. Southerland say was that EPA would, in fact, endorse, in determining toxic sediment, some type of numerical criteria which Dr. Dickey said he would not.

Doctor, could you comment on why you disagree?

Dr. ENGLER. Dr. Dickey, I'd like to respond to that. The individual chemical-specific criteria would not reflect the complex geochemistry of the sediment, the changing mineralogy as you go from one location to another location, changing watershed characteristics, the water characteristics themselves, the characteristics of past disposal and past spills, nor would it address the complex array of potential disposal locations such as, land, sea, or estuarine, each with its own organisms of concern such as, plants and animals, and account for terrestrial organisms versus shell fish in the ocean and anything in between.

The state of the science at this point in time does not support the basis for a single numerical criterion. Take mercury, for example.

Mercury exists naturally in the earth's crust. In some cases, as in San Francisco Bay, it is naturally very high due to Cinnabar, which is an unavailable form of the ore.

In other places you could have light contamination in a low-mercury area giving a low value for mercury. A single number would not address that situation. Moreover, in our contaminated areas, it is rare that we have a single contaminant as a causative agent.

It is always a mixed system. As a consequence, we prefer limiting the chemical inventory as part of a reason to believe test of which chemical may be present. If it is not there, you are home free, of course. If you have your host of contaminants there, then it is preferred to go on to more definitive tests as to the toxicity, bio-availability and nature of the sediment.

The equilibrium partitioning approach is a very promising approach with a certain class of chemicals, such as PCBs, DDT or dioxin. In fact, we are using it in the revised joint EPA-Corps Ocean Disposal Manual as a predictor of maximum bioaccumulation potential. So, there are promising tests on the horizon.

Both agencies are working very hard at research to come up with easier to use tools. Administratively, it is very easy to use a single criterion, but environmentally, it will give you a mixed bag of protection.

In some cases, it could be overly restrictive, other cases underrestricted, but not in a known pattern at this point in time.

Ms. MOLINARI. If you could comment on his comment, and then I will resume my question.

Mr. MATUSZESKI. This is an area of evolving policy, obviously. What we have heard from the Corps of Engineers is a pretty good evaluation of the status of these methodologies with respect to the disposal of contaminated sediment, which is obviously their area of prime interest.

There may be other applications, however, where the chemical-specific criteria would be more useful. In particular, with respect to EPA's responsibilities, we see it being especially useful in controlling upstream discharges into areas of contaminated sediments much as we have chemical-specific criteria to protect water quality from those same discharges.

We see some real value in having that. Now, where the two come together is where you have to deal with the impact in the water and on the food chain, and where you have to deal with the effects of the disposal of sediment. What we are probably moving toward there is some sort of a combined effort where we use the chemical-specific criteria as a sort of flashing yellow light to lead us further on into the effects testing that the Corps is suggesting would be most valuable.

Ms. MOLINARI. So, from an EPA perspective, the criteria serves a purpose for setting standards for future use, and also as a base line for further investigation as advocated by the corps?

Mr. MATUSZESKI. Right. A series of provisions used as warnings to say we need to look further into this.

Ms. MOLINARI. And from the corps' perspective, you might be missing something if you—you would accept the fact that numerical qualifications would in fact serve a purpose for further investigation purposes?

Dr. ENGLER. Absolutely. We use numerical guidelines to determine if this site is contaminated or if this site is quite different from another site, and we need to take a harder look at it. The AETs (Apparent Effects Thresholds) are used as a screen in Puget Sound to screen out the obviously clean from that which is obviously contaminated. Now, we rest with a further array of leaching, bioassays and other tests to determine what to do with the contaminated material. We would agree with that characterization.

Ms. MOLINARI. I have one more question. Mr. Dickey, you had talked about, in your prepared statement and indicated also in your testimony that the corps cannot proceed with a project unless the overall project benefits exceed the project cost.

Could you just go into the criterion you use to define the benefit versus——

Dr. DICKEY. Yes. It is evaluated using a benefit-cost evaluation as well as, of course, an environmental analysis. The simple test for flood control or navigation projects is that the benefits that they produce have to exceed the cost expended on them.

In other words, it represents a sound investment. That is all I was alluding to.

Ms. MOLINARI. A sound investment——

Dr. DICKEY. From an economic point of view.

Ms. MOLINARI. From a transportation point of view or environmental point of view?

Dr. DICKEY. From a transportation point of view.

Ms. MOLINARI. So, who then makes the decision in terms of cost cleanup from an environmental point of view. Does EPA do that or is there no agency that can make that determination?

Dr. DICKEY. We have no program oriented toward environmental cleanup per se in this area.

Ms. MOLINARI. Who is in charge, then?

Mr. MATUSZESKI. There are various authorities under which EPA can get involved. Part of the effort of our work group is to develop a strategy on how to use those existing authorities and whether we need to come to Congress for better coordinating authority.

Ms. MOLINARI. So, right now, Dr. Dickey then, that statement is a legal authorization? Legislatively, that is what you are constrained to?

Dr. DICKEY. Yes. Programmatic authority.

Ms. MOLINARI. And from a legislative perspective, then, we don't have an agency necessarily charged with determining a cleanup based on environmental factors? That is what EPA is working on?

Mr. MATUSZESKI. Well, we have authority under the section 404 of the Clean Water Act and under section 103 of the Marine Protection, Research and Sanctuaries Act to look at environmental issues with respect to the individual permit decisions.

The broader authorities under section 115 of the Clean Water Act, which is authorized to look at cleanup issues but we haven't received funding under that section.

Mr. NOWAK. I turn to Congressman Jimmy Hayes from Louisiana.

Mr. HAYES. Thank you.

Most of what we have been discussing so far involves section 404 permitting. As I understand it, from the testimony so far, we are talking about an instant triggered by a permit application.

What I want to talk about for a minute is when a community becomes aware that there is an environmental problem, that there are toxins that are located in sediment, because that has been determined by studies in my case, the Department of State and by EPA. If we are not looking for a dredging permit, a 404 permit at that moment, I want to get clear under the Clean Water Act and under Superfund just what is it and who has jurisdiction. We know it is there? We know there are dead zones. We have fishermen who are not real educated as marine biologists, but are mentioning that everything is dead.

We have people in the community who read newspapers who say that studies confirm that there are high toxins. Now, where does the responsibility emanate from in that situation? Is it the State? The Federal Government? How do we start moving toward a response to those concerns?

Mr. MATUSZESKI. Mr. Hayes, the primary basis upon which the Federal Government would become involved in that is through the Superfund program. The Superfund program looks at land sites as well as water sites. The difficulty that you run into is that many of the contaminated sediments have relatively low levels of contamination compared to, say, an on-land site where 55-gallon drums have been stored for a number of years and are leaking.

Consequently, there tends to be a bias in terms of a land site as opposed to the lower levels of contamination which may be found in sediments.

Mr. HAYES. That is why the 87 amendments were added.

Mr. MATUSZESKI. Yes, sir. We believe concern for water sites is beginning to occur now. There are a number of sites that I mention in my testimony.

Mr. HAYES. Since that is the case, if I get a call from the head of DEQ in Louisiana and they say, Jimmy, there was some testimony today, we heard people talking about studies. How do we know what kind of studies we should conduct to include both the Corps' concerns that when we start mixing this up through a dredging operation in the future to clean it up, we won't have an unintended consequence in the largest aggregate seafood production in America?

How do we know the criteria that we select will be one that EPA and the Corps will respect if we conclude from that that this is a site that should be given various consideration?

In other words, if our State is willing to expend funds, how do they go about contacting these two agencies to know that the manner in which they do testing, whether it comes out for better or worse in ranking, will be one accepted by EPA or accepted by the Corps, that they won't be thrown away in another test file somewhere?

Mr. MATUSZESKI. For purposes of dredging, if that is part of the effort——

Mr. HAYES. It has to be sooner or later. We can talk about whether, over the course of the next few centuries, it goes away by

itself, but the problem is that it is already brought into public concern because it is clearly established that there are contaminants.

The only way to remove it now at some point is going to require a permit or it will stay there forever. So, we are talking about dredging down the road. How do we shorten the length of the road if the State or the Parish or the port or whomever is willing to undertake studies? Who should they contact to know that the dollars spent on the studies will be used as a scientific mechanism respected by the agencies that are going to do ranking?

Mr. MATUSZESKI. If the interest is cleanup as opposed to navigation, then the Superfund program is the focus of that effort. The Superfund program is moving more and more into these areas.

One of the difficulties with the Superfund program, however, is that at the present time, it only treats food chain effects as a subpathway. One of the things we are working on within EPA is to upgrade to a higher priority the impact on the food chain so that when the national priority list is established these kinds of issues are given greater consideration.

Mr. HAYES. That is what I am saying. If the DEQ says we are—probably the best in the south with inland water quality, and we have some folks over at LSU who would like to work with McNeese who believes that they can give us tremendous data on food chain impact, and in case you never noticed you and Billy Tauzin represent one-fourth of the seafood in Maryland, so economically, it is important that we clean up the process.

What we want to know is when we have our LSU studies or McNeese studies, who cares? We want to know if we used a criteria that will result in an action and a higher ranking under Superfund or did we waste a lot of time? And I am saying who can give that answer and who can give that approval and say yes?

We want to do the following things if you are willing to undertake the following things: Who can they get the criteria from that make it useful?

Mr. MATUSZESKI. The place to get that would be from our Superfund office.

Mr. HAYES. Now, let's say that the testing reveals we have a significant problem. Now, we go to the companies in the region who say, yep, you sure do have a problem. I am sorry to hear about it, but we don't have anything to do with it, because we are permitted and everything we discharged was legal. It has been under the last 55 years, legal.

Now, you have a guy across the river who says, well, I might have been cited and fined a couple of times, but there is a half-century of problem over there, I might owe a little fine, but I sure don't owe removing a couple of hundred thousand tons of sediment.

And then there is an environmentalist who says, when you move that sediment, I predict you will kill every oyster in Louisiana. At that point, whose responsibility under the Superfund, if you don't have an illegal act in the first place, how do you bring business into that? If you do have an illegal act, how do you determine that a .0005 contributing factor, is that part of cleanup cost of is the cost yours under the Superfund, no matter how the discharges got there? Which is the case?

Mr. MATUSZESKI. That would depend on the Superfund authority's establishment of responsibility.

Mr. HAYES. Let's assume they establish the origin, but after you look at 50 years of discharge is minutely related to the cost and problem. In a case like that, what happens? Or let's assume in my other example, that it is the cause, but under older laws that were not as environmentally concerned or no laws at all, there has never been an illegal activity, but there is a great environmental danger.

Where is the cost? Can it be moved to the individual companies, and if not, is it then the State or is it under the Superfund, assume the criteria that no one violated the law, but the problem is there.

Mr. MATUSZESKI. That would be covered by the Superfund.

Mr. HAYES. Then how to get it high enough ranged which leads us back to the criteria for study.

Mr. MATUSZESKI. There is another factor involved in your example. The Superfund priorities are for treatment on-site and the effort will be to see whether or not the site can be capped or technology can be brought in to clean the sediments rather than remove them.

Mr. HAYES. I understand the difference between the packing process you were talking about before, where you put a layer of clean sediment on top, which once again, would have to be determined by study. The problem is, and I hope that all of you understand that I am not taking a shot at your agencies.

I am saying that in our State, we have huge environmental concerns, and we are willing to do something with it. The voters of my State express that when they get the—did the unthinkable. They taxed themselves last year in order to create a fund to do things like cleanup and in order to create a fund to do things like studies.

But it would be unconscionable if we told them they put a tax burden on themselves if they can't look to you and the corps and know what they do in the studies, if they are correct in determining that this is a huge threat to the largest fishing industry—my district has more commercial fishing vessels than the country of Japan, to give you an idea.

So, of course, it is something that they will put the money into in the study. What they do with the criteria in the study has an impact on moving. And that apparently keeps going back to Superfund. But what I am saying is the Superfund is a piece of legislation. It is not a person that you phone.

I want to know who they get approval from to know that their study criteria is going to be valid or who will suggest to them the methodology to be used to make it impressive to you folks and to make it impressive to the corps?

Mr. MATUSZESKI. I will supply for the record the location of that individual or office.

Mr. HAYES. As I say, we have taxpayers who are concerned and who put up their money. They were asked to put up and shut up. They won't shut up because they are watching an industry die, and I think what they will be doing now is to press their State to do the study to reach the criteria.

I think it only fair that the Federal Government tell them who is on the other end of the phone.

Mr. MATUSZESKI. I should clarify that we are working toward using the same tiered testing system for Superfund sites that we are developing for use with the Corps with respect to testing sediment material.

Mr. HAYES. How did Chesapeake Bay work? In other words, how was the relationship between Federal and State agencies, and as far as I know local government, accomplished? Is there any outline of that methodology that I would be able to provide to my State, where it shows the interrelationship, how local, State and Federal Government worked, the means by which informed each other and provided the comprehensive plan for Chesapeake Bay?

Mr. MATUSZESKI. Yes, that does exist.

Mr. HAYES. I would, Mr. Chairman, appreciate that, and I think it could be used—if you suggest improvements that could have been made from past experiences, I would be most interested to knowing that by using the layers of government that worked together that is clearly moving toward successful result.

Mr. MATUSZESKI. The other method of doing that is the National Estuary Program. You may be aware we recently designated the Barataria-Terrebonne as a new national estuary.

[The submissions to the record from Mr. Matuszeski may be found beginning on page 157.]

Mr. HAYES. Thank you very much.

Mr. NOWAK. We will turn to Dennis Hastert from Illinois.

Mr. HASTERT. I certainly appreciate the EPA and especially the corps being here today, and of course, water quality standards being in northern Illinois close to the Great Lakes area, and of course, the need for drinking water are really very important to me.

Of course, the whole metropolitan area of Chicago is dependent on good quality, pristeen water from the Great Lakes to a large extent. As a matter of fact, the depletion of aquifers in the Great Lakes area, especially the Chicago metropolitan area, would mean more dependence on the Great Lakes supply for drinking water, Lake Michigan specifically.

You talk about sediment, and we talk about the outboard situation in Waukegan and other harbors. What threat does that hold for pristeen, high-quality water for that area?

Mr. MATUSZESKI. The drinking water standards that have been established nationwide do apply to waters that are being taken from the Great Lakes, and those waters do meet the standards at this time.

The major threat human health relates to the level of uptake of various contaminants into the biota, and ultimately into fish species which are consumed by the public.

There are indications that there have been effects on human health from over-consumption of various fish species from Lake Michigan. Those studies are ongoing, but that seems to be the main focus of concern. This has led to a substantial number of fish advisories on consumption.

Mr. HASTERT. Really, the threat is—the question is, what do you do with contaminated harbors like we have in Waukegan or U.S. Steel facility in Gary, Indiana, or offshore deposits off the City of Chicago, really determine what the water quality is going to be

and, in fact, whether we will be able to use that water in the future, is that correct?

Mr. MATUSZESKI. That is correct.

Mr. HASTERT. One of the things, I guess the linkage is that really concerns me is that my district, very small part of it, has some Lake Michigan water in it, but the very aquifers that we need to protect to provide that huge growth we have are the aquifers that are being relieved by the Lake Michigan water and the water in the greater Chicago metropolitan area, where we buy water from the City of Chicago and they have the pipes and the toll keepers there.

One of the reasons I am concerned especially with the Corps of Engineers, last year, I asked the corps to do a study on the recharge area for the major aquifer in that area, Newark Valley aquifer, and the corps came out last week, as a matter of fact Friday at 5:00—I guess that is a good time, you can't reply to these types of things Friday at 5:00—it said, conclusions and recommendations, the site, conditions of the proposed project do not provide the best land fill siting conditions, because the Waukegan aquifers discussed in this report are in close proximity to the project.

And basically, the report goes on and says that this whole program would have to be completely re-engineered perspectively. It says, because of site conditions, we have made additional recommendations for engineering to be taken under consideration by the siting body, et cetera, et cetera.

And even in the press report, I was amazed it goes on to say the project can be engineered to prevent any contamination of the aquifer which we depend on, but it doesn't say it does now that is what the evaluation was supposed to be, so I take my hat off to the Corps of Engineers, they are redoing these projects in their press releases.

One of the things that bothers me most of all, and you might respond to this, Dr. Dickey, in your press release, your report is one thing, but the press release you put out at 5:00 on Friday in my District, it says, U.S. Army Corps of Engineers submitted a report to Congress that concludes the proposed bill fills sanitary landfill, which I am worried about, my aquifer, proposes virtually no risk to the Newark Valley aquifer, on and on and on.

I don't understand where you are coming from when you start to talk about protecting pristeen waters in the oceans and the lakes, and the aquifers, because it is a recharge area and that is you responsibility, how in the world can you put out a report one time and then put out a press release with the audacity of saying this?

Where were you coming from? Who are your writers? Do they read the reports? I don't know—are you playing political games? What is happening?

Dr. DICKEY. I am frankly at a loss with regard to any press release.

Mr. HASTERT. It is not my press release, your press release, Army Corps of Engineers news release, Friday.

Dr. DICKEY. The thoughts that you express there are the same ones that are expressed in the transmittal that transmitted this report to Congress signed by me on May 11, that is true. I think we stand behind that report.

Mr. HASTERT. How about the press release?

Dr. DICKEY. To the extent the press release is reflective of the transmittal, and the report.

Mr. HASTERT. That is not what the report says. It says the site conditions of the proposed project do not provide the best landfill siting discussions, because the aquifers discussed in this report are in close proximity to the project and the sand lenses and everything else that goes with it.

Dr. DICKEY. There are two points to be made, if I might. One is that one can comment on the site, which is the definition of the engineering problem, and the point of engineering is to respond to—it is a design problem, and I think the conclusion was that the aquifer there would be protected if the Balefill——

Mr. HASTERT. If you re-engineer it?

Dr. DICKEY. Correct. I am sorry?

Mr. HASTERT. If you re-engineer the site, that is what you are saying. It says the project can be engineered to prevent——

Dr. DICKEY. If it says—in accordance with the report, that is right.

Mr. HASTERT. So——

Dr. DICKEY. I don't know if that is re-engineered, I am saying the report lays out the conditions under which the Balefill landfill could be satisfactorily operated without risk to the aquifer.

Mr. HASTERT. I didn't understand what you just said.

Dr. DICKEY. I said the report concludes, as stated in the transmittal, that if the Bailfill is constructed and maintained in accord with the recommendations in the report, that there would be no risk to the Newark Valley aquifer.

Mr. HASTERT. It says Congress—the proposed bail fill sanitary letter proposes virtually no risk. The aquifer provided the project is constructed, maintained and designed, and additional engineering recommendations contained in the report are implemented.

You are asked to say this is safe—it is a done deal. It was approved by the engineering, IEPA, but now, all of a sudden, you are saying it has to be re-engineered, it is safe. I don't understand.

The issue is, some of us are elected to protect pristeen water standards. I have five to 600,000 people that elect me to office that depend on shallow drinking water, especially because EPA says deep drinking water has radium. We have to blend it, we have a super problem there, but all of a sudden now, you do this study, and you say it is not an appropriate place to do it in your report, and you put out a press release that says it is.

I don't understand where you are coming from. I would like to have an explanation of that.

Dr. DICKEY. We will certainly provide that, sir.

[The information received from Dr. Dickey follows:]

BALEFILL LANDFILL

I infer from your remarks that your are interested in my answer to the following question: Why does the news release differ in some respects from the findings of the report? Specifically, why did the news release not mention one of the report conclusions stating that "The site conditions of the proposed project do not provide the best landfill siting conditions because the aquifers discussed in this report are in close proximity to the project"?

The press release was prepared by the Chicago District, Army Corps of Engineers, and generally addressed the report requirements contained in Section 47(b) of the Water Resources Development Act of 1988, which states that: 1) the Secretary of the Army must provide a report to Congress on the impact of a sanitary landfill proposed to be built in Bartlett, Illinois, on the Newark Valley Aquifer; 2) the Secretary of the Army shall consult with the Administrator of the Environmental Protection Agency with respect to the impact of such landfill on the Newark Valley Aquifer; and 3) the Secretary of the Army shall consider the impact of such landfill on the ability of water from the Newark Valley Aquifer to dilute naturally occurring radium in ground water to meet the USEPA mandated standard for drinking water supply.

In the press release, the District indicated that the Solid Waste Agency of Northern Cook County's (SWANCC) proposed Balefill Landfill project, as presented in SWANCC's permit application, was designed to specifically overcome adverse site conditions. Although, the press release did not specifically state that the project site does not provide the best landfill siting conditions it did say "... the finding does not, however, represent approval of SWANCC's permit request. ... additional factors such as the need for the project, the availability of less damaging alternatives, impacts to wildlife habitat and a nearby nature preserve and comments from state and Federal agencies will be considered in determining whether to issue or deny the permit."

In the Congressional report conclusions, the District states "Because of the site conditions, we have made additional recommendations to be taken under consideration by the Chicago District's Regulatory Functions Branch during their evaluation of SWANCC's application for a permit under Section 404 of the Clean Water Act for this project." These additional recommendations went beyond what was required in preparing the Congressional report and are sill under evaluation as part of the standard processing of SWANCC's permit application.

Mr. HASTERT. I would like to have a meeting to do that. It is on the record. As far as everything else you do, all it is is smoke screen. You talk about pristeen standards of lake water and ocean water, but yet, you stoop to this type of stuff, then your agency has no credibility, period.

Thank you, Mr. Chairman.

Mr. NOWAK. I assume you two will talk again, perhaps an appropriate time with some more definition. I don't know if, Dr. Dickey, you have all the facts that Mr. Hastert has just been made aware of.

Mr. HASTERT. The doctor signed the report.

Mr. NOWAK. And that sometimes doesn't mean you have all the facts, but regardless of that, hopefully you can, you know, make a detailed response to Congressman Hastert, so we can move forward with not only that program, but see perhaps if there is anything else that can be developed for a more satisfactory kind of a program.

Let us—let me turn back to something we were discussing in the beginning, whether or not there are demonstrated effects on fish and wildlife. The other meeting, we talked about the contamination and the possible bioaccumulation of those results throughout the life of the fish which are being consumed, and the question came up of how directly we can relate those problems to our own health problems.

There was an IJC document that just came forward where they agreed with the conclusion that there were adverse health effects, as well, and I am wondering where we are in our studies of the different States, the studies they do on the fish and the warnings they issue out, and how our science is moving, so that we can better define that kind of problem.

Mr. MATUSZESKI. Yes. EPA has undertaken a study to bring together in one place all of the standards that are being used by State governments currently to evaluate the safety of fish and to establish bans or controls on fisheries.

That work has been completed, and we are using it as a base document for the annual meeting in August in Pittsburgh of the American Fishery Society, which is the preeminent group dealing with the science of fisheries health. We have worked with them to dedicate an entire day of that meeting to precisely this issue so that we can receive papers and evaluation of the information we have been able to bring together. We also want to be able to get a better handle on the extent to which the various procedures, methodologies used by the States to establish fisheries, controls, bans and consumption advisories are in need of some standardization; or whether, in fact, there are general agreements on what levels are appropriate.

Mr. NOWAK. The IJC report really relied on other studies that were made, I think several years ago, in and around the Great Lakes for that—for that conclusion, and we are—I wonder if you could comment on what advisory the Federal Government now is using, either on the sport fishing population or the commercial fishing population?

Mr. MATUSZESKI. My understanding is that the Federal Government relies essentially on the States to carry out this function.

There are some Food and Drug Administration criteria which come into play, but it is essentially a State determination based upon their health programs.

Betsy, would you like to say something more?

Ms. SOUTHERLAND. The FDA, of course, only regulates fish that are in interstate commerce. The FDA essentially has mercury, PCBs and several pesticides covered, and that is it. For all the other chemicals of concern, it would be a State responsibility, based on their concern about local or subsistence-level fishermen.

Mr. NOWAK. When we look at the total dollars that are being spent in this area, there has been much concern that we are not going to be able to move fast enough to make these determinations, and in fact, the problem is outpacing us. There are still substantial loadings going into several areas from many, many different sources.

I am wondering if either of you have any thoughts as to how we could move this process along faster? You are devising a "Green Book" now, is that correct?

Mr. MATUSZESKI. That is correct. The Green Book is out for comment.

Mr. NOWAK. And the dredged spoils and bottom sediment are part of this problem? From your studies and the other work that you are doing in this area, even though we have made some progress with the—certainly, the secondary treatment plant operations, would you consider that the loadings have dropped to an extent where in many of these areas where you have secondary treatment now achieved, that you would be in a position to go and actually do a—either a complete or partial cleanup, without the fear that your loadings are coming in at a rate that is going to change, within a matter of years, that environment back to where it was?

Mr. MATUSZESKI. The difficulty we encounter is that a larger and larger percentage of the remaining loadings are coming from nonpoint source locations, and consequently, the emplacement of best management practices through the State and local governments is going to be the key to assuring that we do not continue to get those kinds of loadings.

We will, of course, make progress as we move forward in the establishment of criteria that we can apply to the next round of permits upstream, and that effort to develop criteria is somewhat sensitive to the availability of resources.

In other words, were we to have a substantial increase in resources, we could begin to speed up that process somewhat in coming years. We will not be able to speed up the process much, however, before we receive the report from the advisory board, which we expect this winter. Once we get into the business of establishing criteria for control of upstream discharges and for evaluation of nonpoint sources, we will be able to speed up our efforts, depending upon the level of resources we have.

Mr. NOWAK. Well, we would hope you would keep us advised as you start to make those determinations and look at where—such as a nonpoint program—you are going to need an awful lot of money, I would think, if you are going to make any substantial progress after this point.

There is advanced technology, I am sure, from the point sources that can be upgraded, but it would seem from everything we have heard, the combines, the overflows, the urban runoff, the runoff from farm lands and fertilizers that are out there, are going to continue to be pouring into the system, and I don't know if that is not—that load is outpacing what we are really cleaning up.

So, hopefully we could look for your input, trying to take a larger section of that nonpoint pollution to start to debate some of that.

Just the CSO problem, we discussed that extensively already, and we have had all kinds of inputs from mayors of cities that are giving us need studies that if they go to the ultimate solution, which I guess is separation treatment, we are talking about twice as much as we have spent on the whole program for secondary upgradings, and we don't have a program to do anything out there.

I am wondering now, once we have reached that level, if that ends, if we are not going to be back in the same position we were 20 years ago?

Mr. MATUSZESKI. Undoubtedly, the CSO problem is something that is going to continue to be a major concern with respect to sediments, particularly in northern cities. We intend to deal with that issue, as I believe you are, in the context of reauthorization of the Clean Water Act, because we think it is a major unresolved area of the law.

Mr. NOWAK. And we talk about inventories here for bottom sediments, but we don't have an inventory what is coming out daily as it rains throughout the city, what kind of a load you are getting in there, what kind of treatment.

So, hopefully, as we go back to do this reauthorization, we can bring in pieces of this so we can look at this as a whole problem, not only the second level, which is receiving only a limited amount of the total problem into the plan.

So we will look forward to your input on those, those regards, and again, I will keep the record open for additional questions we would like to submit to you in writing to finally fill out the record.

Thank you both for your attendance, and, of course, Dr. Dickey, you have a little more responding to do than EPA, I guess. Thank you very much for your presence.

[Mr. Matuszeski's prepared statement appears on page 138.]

[Mr. Dickey's prepared statement appears on page 102.]

Mr. NOWAK. I would now like to bring forward from the National Academy of Sciences Kenneth Kamlet, who is the Chairman of the Committee on Contaminated Marine Sediments, Marine Board, National Research Council.

Welcome, Mr. Kamlet, and we will, again, incorporate your testimony in total in the record, and allow you to proceed as you so desire.

TESTIMONY OF KENNETH S. KAMLET, CHAIRMAN, COMMITTEE ON CONTAMINATED MARINE SEDIMENTS, MARINE BOARD, NATIONAL ACADEMY OF SCIENCES

Mr. KAMLET. Thank you, Mr. Chairman.

My name is Kenneth S. Kamlet. I am a principal in the management consulting firm of A. T. Kearney. I am pleased to appear at

this hearing, however, in my capacity as Chairman of the Committee on Contaminated Marine Sediments of the National Academy's Marine Board.

I am here to discuss the findings and recommendations of our report entitled, "Contaminated Marine Sediments: Assessment and Remediation." Pursuant to its charge, our Committee examined three things:

The extent and significance of marine sediment contamination; the state of the art of cleanup technologies and related management strategies and R&D needs and issues.

Our committee found on the issue of extent and significance that contaminated sediments are widespread throughout U.S. coastal waters, having been documented in at least 63 marine and estuarine waterways.

We found the problem to be potentially far-reaching in its significance; that it provides cause for concern regarding potential contamination of seafood; and that sub-lethal effects require increased attention; but that the extent of the risk posed is unknown.

We also found, however, there are inadequate data to prioritize candidates for remedial action, and that there are no generally accepted definitions of contamination requiring remediation.

Our committee concluded that a "how clean is clean" standard is clearly needed, both to define cleanup targets and to set priorities. We recommended that a comprehensive national program be initiated to delineate areas with contaminated sediment.

However, we were concerned that remedial action not be delayed, as these efforts proceeded. The committee found that no agency within the Federal Government had assumed responsibility for inventorying sites with contaminated marine sediments.

We recommended, at a minimum, the establishment of an Interagency Technical Committee to evaluate sediment contamination data to help focus limited resources on the most needed research and monitoring.

We also felt improving the hazard-ranking system to explicitly address food chain contamination would enhance the identification of and response to contaminated sediment problems under Superfund.

On the issue of the state-of-the-art of cleanup technology, our Committee concluded that existing technology is adequate in most situations. However, we found that several factors tended to constrain the accomplishment of effective cleanups.

We found that the time required for EPA to make a cleanup decision was more often a limiting factor than any constraints imposed by science or technology. One way we identified to reduce such delays in certain circumstances was to take advantage of the opportunity to piggyback remedial actions on existing dredging activities.

Another constraint has sometimes been the difficulty of obtaining certain specialized dredging equipment in the United States, due in part to Jones Act restrictions.

A third potential restraint relates to capping. We found capping of contaminated sediments can be a useful remedial technology, but that its use could probably be facilitated if it were given preferred treatment status under section 121(b) of the Superfund law.

On the subject of remediation strategies, the committee found that no action, management in place, excavation for off-site management, or even thermal treatment, stabilization, or biological or chemical treatment, are all viable management strategies in particular circumstances. The more high-tech techniques tend to be viable less frequently.

However, although as many as 13 percent of EPA Superfund sites may involve coastal sediments, no remedial action has been selected to date in the vast majority of these sites.

Our Committee also recommended that additional consideration be given to the applicability of Corps of Engineers dredged material management strategies to more severely contaminated sediments.

Finally, we pointed out two important distinctions between sediment contamination problems and most upland hazardous waste problems. First, sediment contamination tends to involve larger volumes of somewhat less contaminated material.

And, secondly, large-scale remedial technologies, extensive preremediation studies, and costly treatment or destruction technologies have limited application to most contaminated sediment sites. In short, it is especially important that we apply cost-effective cleanup strategies to coastal sediment contamination problems.

Four straightforward conclusions come out of the report. One, there is a problem. Two, it is widespread and significant, but not well-quantified. Three, it has aspects that are distinct from those at upland Superfund sites. And, four, it requires systematic attention.

Thank you.

[The prepared statement of Mr. Kamlet appears on p. 127.]

Mr. NOWAK. Thank you very much.

You make the statement in your testimony concerning "piggybacking" of navigation dredging, along with some of the environmental work that goes along in many of these port development areas.

You have a combination of clean areas; we have seen in Waukegan where the corps is doing some of the dredging outside "of a very narrow Superfund site." The Superfund site has been designated for treatment, and they are actually moving forward treating a lot of the sediment on-site.

That technology has some promise, I think, for many other areas around the Great Lakes. As they are moving forward, perhaps not as dramatically because of the high counts of PCB in Waukegan, and still, there are other chemicals as well as PCBs in those other areas and different mixtures.

Do you have any comment? Is there any general technology like that used in Waukegan that could be transportable, if you will, to other identified sites, even if there is a different mix of contaminants?

Mr. KAMLET. I am not familiar in great detail with the approaches employed in Waukegan, but the Marine Board and the National Academy several years ago in another report, entitled "Dredging Coastal Ports", did draw the conclusion in terms of effectively managing bottom sediments that are dredged in the course of navigational dredging, that there were economies to be gained, and incremental environmental protection possible by differentially treating more or less contaminated components of those bottom sediments.

That is, approaches that would make sense for moderately or slightly contaminated materials might well not make sense for the more heavily contaminated materials. So, for the less contaminated stuff, unconfined open water disposal might be an appropriate way to go that is safe for the environment, and quite cost-effective, whereas the small quantities of contaminated material would require more careful management, more costly dredging and management technologies.

It seems to me that that concept, differential management of dredge material in navigable rivers and harbors, would have application here as well.

Mr. NOWAK. The differences in looking at numerical rankings or looking at other methods to determine the appropriateness of action, that discussion goes on. I think one reason it does is because some of the methods haven't really been designated and Superfund criteria for listing are not met under the water in many of these instances.

There are a few that have been designated Superfund sites, but the time required for such a designation is great. Are there any suggestions that you could give us as to how to bring down that time frame to make this program more effective and actually get to a proposed cleanup method?

Mr. KAMLET. Well, I would make two comments in response to that. One in terms of the existing hazard-ranking system that is used under Superfund for ranking sites, for potential remediation under Superfund. As Mr. Matuszeski indicated, the hazard-ranking criteria were modified in response to Congressional direction under SARA to require food chain contamination to be considered as a pathway.

It is true, right now, food chain contamination is considered only as a subpathway to the surface water pathway, but I do expect with the incorporation of that sub-pathway to the hazard-ranking system, many more aquatic sites will now qualify as Superfund LPL sites than had been in the recent past.

I would by no means rule that out as a potential viable avenue, even in the near term, before EPA takes the further step of elevating food chain contamination to full pathway status.

The second point I would make is that, in addition to hazard-ranking and remedial action treatment under Superfund, there are separate natural resource damage authorities under Superfund that provide a basis for State or Federal natural resource trustees under Superfund to seek natural resource damages in connection with impairments of natural resources, both water and living biota, in cases where contaminant releases have resulted in impairments of those resources.

This is the independent mechanism under Superfund that does not require national priorities list ranking that is available to promote restoration and replacement of damaged natural resources under Superfund in cases where contaminated bottom sediments may have caused impacts of that kind.

Mr. NOWAK. On page 5 of your testimony, you recommend that we establish or there be established an Interagency Technical Committee to evaluate existing and emerging data on sediment contamination, and as we look forward to some type of national inven-

tory, I think there has been concern and the concern is we don't want to wait for action on the known contaminated sites while we look and search for two years and establish some super-priority list which, again, pushes us back.

This Interagency Committee that you mentioned, who would we—certainly, you know, agree this cuts across a lot of jurisdiction. Would it be your opinion that EPA should be at least the lead agency of that Interagency Technical Committee?

Mr. KAMLET. I don't think our committee took a view as to who should chair that agency. We did suggest that not only should the relevant Federal agencies all be represented on such a committee, but that representatives of State agencies might appropriately be represented on this committee as well, and perhaps outside experts outside the Federal and State Governments.

The thought was that, given the state of flux of the technologies and of the evaluation of the data that is out there, some centralized mechanism for quality controlling, coordinating and helping to focus the data of the evaluations would be helpful and would be useful in promoting expeditious and effective remediation actions. So that was the rationale behind that recommendation by our committee.

We did not take a stance on whether EPA or the Corps of Engineers or some other entity ought to appropriately chair such a committee.

Mr. NOWAK. Let me turn to Dennis Hastert, for any questions or comments at this time?

Mr. HASTERT. No questions, Mr. Chairman.

Mr. NOWAK. Mr. Geren?

Mr. GEREN. No questions.

Mr. NOWAK. Looking at page 7, you talk in terms of capping as a useful and appropriate remedy. Did you, in your investigation, conclude that capping was appropriate in more areas of contamination than that? I mean, where is the capping appropriate?

Mr. KAMLET. We laid out in our report a number of circumstances in which capping would not be appropriate, and basically took the position that in most other circumstances, capping might be efficacious. Some obvious examples of instances where capping would not make sense would be within a navigation channel.

Obviously, if navigational dredging were to be going on in an area, it would not make sense to use capping as a remediation option. One could not have any confidence that the cap and the underlying material would remain in place.

Similarly, there are areas even in the coastal marine environment where ground water upwelling occurs. In areas of that sort, capping would not make a whole lot of sense. There are also some areas that are fished by trawling and with drag lines and other techniques that disturb the bottom.

In areas of that kind, capping would probably not make sense. In other cases where the current energy, the bottom environment is such that you don't have high erosional sources at work, capping may well make sense, and may provide long-term stability for contaminants that are present on the bottom, particularly given the fact that contaminants build up on bottom sediments in areas that tend to be net deposition environments. These are areas were sus-

pended particles tend to settle anyway, suggesting that they are fairly stable, and in such circumstances, capping may be a very efficacious way to achieve relatively long-term and permanent confinement and isolation of the contaminants.

Mr. NOWAK. What type of material is—has been used for capping, and has that actually been put into any of these contaminated areas that you are aware of?

Mr. KAMLET. I am not aware of instances where capping has actually been used in a Superfund context, in an offshore environment. There are certainly instances in the New York Bight outside of New York Harbor; in New England; and, I believe, in the Norfolk area in Virginia, where capping has successfully been used for moderately contaminated sediment, in ocean-dumped dredged material.

The types of capping material used range from sandy material to clay-type material, and what type of material makes sense to use in a particular case depends in part on the nature of the existing bottom sediments in the area to be capped.

If you want to encourage natural recovery of those areas, you want the new bottom conditions to resemble those of the pre-existing bottom, otherwise the same kinds of organisms that had established themselves are not likely to reestablish themselves.

But it depends on what the effect is that you want to accomplish, and on what the biological conditions are that you want to restore.

Mr. NOWAK. Clay has been mentioned and used on several Superfund sites and other less heavily contaminated areas, and land based capping has gone up as high as one to three foot, I guess, in certain circumstances.

Besides clay, would you visualize that stone could be used for successful capping programs?

Mr. KAMLET. Stone might be more effective in an upland environment than in an underwater context. One of the things you would want a cap to accomplish is to provide not only cohesion so the cap maintains its integrity, but also some absorptive capacity, so any contaminants that are mobilized can be trapped in the cap and prevented from emerging into the overlying environment.

In general, the more fine-grained the sediment particles, the greater the cohesive properties and the greater the ability to absorb contaminants. I would not think that stone, even crushed stone, would be very effective in that regard.

In an upland environment where you want to primarily keep animals out and prevent access by larger organisms, and you don't have water moving in and out of the system in the same degree it might be more effective than in an underwater context.

Mr. NOWAK. Your report also notes that you use the term "cabotage."

Mr. KAMLET. "Cabotage."

Mr. NOWAK. Those laws are restricting the import of certain technologies for possible cleanup. Could you tell us how significant you think these restrictions are in limiting cleanup efforts?

Mr. KAMLET. I don't have any reason to believe that it is a very significant constraint on cleanup. I am aware of some examples a number of years back of specialized dredging equipment that, I believe, was brought over from Japan. It was able to be used in a re-

search and development context. I think the thrust of that technology was to limit the turbidity that is normally associated with dredging in ways that traditional dredging equipment is not capable of doing.

Under the Jones Act, the "cabotage" laws that you refer to, such equipment, at least as part of vessels, could not be brought into the United States, if it were not constructed on U.S. vessels and flying U.S. flags.

Mr. NOWAK. Land-based technologies have been brought over from Europe and other places, for, I believe, the one in Waukegan is from Europe, is that correct? Do you know that?

Mr. KAMLET. Again, I am not familiar with the specifics there. The only constraint under the Jones Act, as I understand it, relates to vessel-associated equipment and where that vessel was manufactured.

Mr. NOWAK. Well, thank you very much for your testimony.

Again, we are going to have an opportunity to review all of this and compare it to other statements we are going to receive, and we are going to receive some differing views, I am sure, tomorrow, so we will have the opportunity to go back and open the record again and contact you for other, perhaps, further information.

Thank you for your appearance.

Mr. KAMLET. Thank you.

Mr. NOWAK. The subcommittee will adjourn until 1:30 tomorrow in this same room.

[Whereupon, at 11:53 a.m., the subcommittee recessed, to reconvene at 1:30 p.m., Wednesday, May 16, 1990.]

CONTAMINATED SEDIMENTS

WEDNESDAY, MAY 16, 1990

HOUSE OF REPRESENTATIVES,
SUBCOMMITTEE ON WATER RESOURCES,
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION,
Washington, DC.

The subcommittee met, pursuant to call, at 1:45 p.m., in room 2167, Rayburn House Office Building, Hon. Henry J. Nowak (chairman of the subcommittee) presiding.

Mr. NOWAK. The subcommittee will come to order.

This afternoon the Subcommittee on Water Resources meets to continue to receive testimony on issues relating to contaminated sediments.

As we heard yesterday from Mr. Kamlet, sediment contamination is widespread throughout United States coastal waters and potentially far reaching in its environmental and public health significance.

Our witnesses made it clear yesterday that additional steps need to be taken to improve sediment restoration and protection efforts. The federal agencies have made commendable progress in starting to take steps within existing authorities.

Protection and restoration of sediment quality is addressed by several laws. The Clean Water Act gives EPA lead responsibility for safeguarding the quality of the United States coastal and inland waters and sediments.

The Clean Water Act and the Ocean Dumping Act mandate that EPA and the Army Corps of Engineers oversee dredging and disposal activities.

EPA further carries out Federal responsibilities required under Superfund for ensuring cleanup of inactive or abandoned hazardous waste sites, including underwater sites.

The subcommittee has held several hearings over the last few years on contaminated sediment issues. Today's hearing will continue our focus on the status of current programs and proposed legislative options for restoring and protecting the quality of sediments.

I am pleased to have testifying before us today two of our colleagues from the Miami area, Congressman William Lehman and Congresswoman Ileana Ros-Lehtinen.

We are also pleased to have a Member of our own subcommittee, Congressman Frank Pallone, testifying before us today. In addition, we welcome the expertise of witnesses from both the environmental community and the port interests.

Before we hear from our witnesses, I would like to yield to my distinguished Ranking Republican from Minnesota, Arlan Stangeland, for whatever opening remarks he wishes to make.

Mr. STANGELAND. Thank you, Mr. Chairman.

Today, the subcommittee continues its hearings on contaminated sediment. Yesterday's opening session provided us with a good presentation of the factual situation and also some of the issues we will have to address.

Clearly, in fashioning a legislative approach, we need to encourage an expansion of our understanding of the problem and also strive to do more to help solve the problem.

Today, we will hear from Members of Congress and affected interest groups, including representatives of our Nation's port authorities, dredging contractors, and the environmental community.

I want to welcome all of our witnesses and assure them that this subcommittee and this Member will carefully review their testimony and consider their points of view.

With that, Mr. Chairman, I have no further comment. Thank you.

Mr. NOWAK. Thank you very much, and once again, I want to welcome our panel.

But before we turn to our panel, Mr. Cox, I believe has a short statement he would like to make at this time.

Mr. Cox. I would simply add my welcome to Congressman Lehman and Congresswoman Ros-Lehtinen. I am looking forward to your testimony as well as Mr. Dusseau.

Mr. NOWAK. Thank you.

We have again our good friends, Bill Lehman; and Ileana Ros-Lehtinen, who is accompanied this morning by Charles Dusseau, who is a commissioner, and who I have had the pleasure of talking to and meeting several times to discuss this problem and others as well.

We welcome you before the panel, and we will turn to Congressman Lehman for his testimony.

TESTIMONY OF HON. WILLIAM LEHMAN, AND HON. ILEANA ROS-LEHTINEN, REPRESENTATIVES IN CONGRESS FROM THE STATE OF FLORIDA, AND CHARLES DUSSEAU, COMMISSIONER, METROPOLITAN DADE COUNTY

Mr. LEHMAN. Thank you, Mr. Chairman, Mr. Stangeland and Members of the subcommittee.

I have a statement which I will leave here for the record and just make a few comments. I want to thank the Chairman for his visit to Dade County to see firsthand the situation with the Miami River. Unfortunately, it was probably the hardest rain we have had in many months, and our boat trip had to be cancelled, but we did have a visit to the shores of the river. I think the Chairman understands the situation, especially in regards to contamination in the Miami River.

Also, I want to thank the Chairman for his cooperation with another problem in Florida, and that is the authorizing language and the help you provided for the Kissimmee River, and I want to let you know how much we appreciate that.

You are familiar with the situation in the Miami River. As I have mentioned several times, I used to catch fish under the Miami bridge when I was first in Miami 30 or 40 years ago. The river is no longer biologically alive, and the reason it's not alive is because of the contamination and the residue and the runoff.

There is present legislation on dredging, as you know, for navigation. We are hoping from this and other testimony, that your committee will find it feasible to provide the kind of legislation for this and other bodies of water that will permit the authorization for the kinds of dredging by the Army Corps of Engineers that would not be limited to just navigational purposes but also for environmental reasons.

I think that this is just as important as navigation, and I think that the Chairman is aware of this. And I would like to just again thank the Chairman for his visit to Miami.

And if you would provide the authorization for this dredging for environmental reasons, I would pledge my top priority in the appropriation process to help the Energy and Water Subcommittee on Appropriations to provide the funds to substantiate your authorization in these matters.

And thanks a lot.

Mr. NOWAK. Thank you very much.

Congresswoman Ros-Lehtinen.

Ms. ROS-LEHTINEN. Thank you, Mr. Chairman and Mr. Stangeland for the opportunity to appear before you with my colleague and good friend from Miami, Congressman Bill Lehman, so that we can provide you with information regarding the Miami River and to request your support in joining local efforts in South Florida to make timely action in meeting two very important goals for us.

Number One is to abate pollution and to improve the water quality of the Miami River and hence, in Biscayne Bay, and also in Biscayne National Park and the Biscayne Bay Aquatic Preserve.

And Number Two is to improve navigation by maintaining proper clearance for commercial and private vessels.

The Federal role in navigation improvements to the Miami River dates back to 1930 when the Miami River Navigation Channel was authorized as a Federal public works project.

In 1933, the Army Corps of Engineers established the navigation Channel by box cutting a channel in the river's underlying rock layer, and then dredging a navigational channel 15 feel deep through a 5.5 mile length of river.

And as early as 1972, Congress went on record to support efforts by the U.S. Army Corps of Engineers in the interests of navigation, pollution abatement, and other allied water purposes pertaining to the Miami River.

The corps has periodically responded to further congressional directives to assess the navigation and clean-up needs of Miami River. And the latest congressional provision for such corps activity is included in section 1162 of the Water Resources Development Act of 1986. And that Act authorizes and directs the Secretary of the Army to remove polluted bottom sediments from the Miami River, and the Seybold Canal.

In a draft feasibility report which was made available for circulation and review in December of 1989, the Corps found that no na-

tional economic development benefits could be identified for the removal of contaminated sediments in the Miami River, and we in South Florida do not and cannot accept this conclusion from the corps.

There is a long standing established set of trade links, both on paper and on the water, that serve to tie the United States and the countries of the Caribbean Basin together. A majority of this trade is through the Port of Miami and the Miami River.

And the Miami River, like some of our water resources, has suffered from our early indifference to our natural resources.

Over the years, pollutants have entered the river from a number of sources, mainly manmade sources which could be expected to be experienced in an urban river.

And efforts to abate the pollution of the river have been underway by a variety of state and local entities in both the public and private sectors. Most recently, the Miami River Coordinating Committee whose members are appointed by the Governor, have been to the forefront of efforts to save the river.

In addition to industrial and shipping related pollutants, the local jurisdictions abutting the river discharged storm and waste water directly into the river.

Such actions largely ceased by 1960, when the direct discharge of municipal and county waste water was discontinued.

The river still does receive some overflow as well as pollutants borne by storm sewer outfalls. And the City of Miami has already established a storm water management utility and a countywide storm water management utility is currently under study as well.

A few weeks ago more than 150 concerned citizens, public officials and businessmen who depend on the Miami River for their livelihood gathered together for a dredging summit. This unprecedented gathering underscores the concern for our river and it economic, as well as environmental future.

Every time that a tow goes across the river, there is a polluted sediment that is kicked up and carried into the pristine waters of Biscayne Bay, and at this meeting, it was brought out that an Army Corps of Engineers' report said that if this build-up of sediment continues, larger vessels will be unable to use the Miami River by the mid 1990s.

Mr. Chairman, we do not seek any lengthening or deepening of the river. We seek to ensure that the port functions of the Miami River continue to be able to function as a vital element in the South Florida and Caribbean Basin economies.

We also seek to clean the river of the accumulated toxic sediments so that the Biscayne Bay is protected and the river's recreational benefits can be enjoyed by all of our citizens.

I would like to urge the subcommittee to expand and clarify the role of the U.S. Army Corps of Engineers to include environmental assessment and evaluation in determining the viability of dredging needs.

Again, Mr. Chairman, thank you for giving me this opportunity to testify on this very important project for my district. I have submitted a more detailed statement which I would like to request to have it be entered into the record transcripts along with my testimony today.

Mr. NOWAK. Thank you.

Without objection, that total record will appear.

And we will now turn to Mr. Dusseau.

Mr. DUSSEAU. Mr. Chairman, Mr. Stangeland, thank you very much for having me here today. It's truly a privilege and an honor to be before you and to be sharing this testimony with two of our Congressmen from Dade County.

We certainly appreciate the Chairman's interest, his visit coming down, and we would certainly like to invite the Chairman or any Members of the committee to come down again.

As a matter of fact, we will be having a fish fry on the banks of the Miami River this coming Saturday. I guarantee you the fish will not be from the Miami River.

There is a very important aspect to all of this, and that certainly is that there is a local component in all of this process of cleaning up the Miami River.

And as Congresswoman Ros-Lehtinen pointed out, we have taken some comprehensive steps and ongoing steps to make sure that the local component is there.

In essence, direct discharge has ended, and we are working on to see that there is no real runoff in the future, although obviously because of some very old facilities that cannot be updated in an expeditious fashion as we would like.

There is still some runoff and still some storm water that which runs into the river. I believe the Congresswoman's statements and the Congressman's statements point to the various problems involved in terms of shipping, in terms of pollution, et cetera.

The real point of all this right now and why I believe there is an urgency is that there is a cost for doing nothing.

In other words, this is not the kind of work which is merely desirable, for which we hope to achieve some objective that maybe is not of the utmost necessity.

This is a necessity for Dade County, and not just Dade County but for many parts of the Caribbean to assure the viability of the Miami River, its navigability, and also to guarantee the viability of Biscayne Bay as a state aquatic park, portions of which is a national park.

There was an article in the Miami Herald today which discussed the fact that the weather patterns are changing in Africa, and we are very likely to see a surge, an increase in the number of hurricanes which we will be facing in our part of the world.

That means that the very real possibility of a major surge down the Miami River due to a hurricane and the washing out of many of these highly contaminated hot spots into the Biscayne Bay is a very real possibility in the near term.

This is not something that might happen. It will happen. The additional problem that we are facing, as our testimony, our written testimony points out, is the fact that the Coast Guard themselves have said, beginning perhaps as early as 1994, many of the ships, even the shallow draft ships which are the life blood of trade in the Caribbean, will no longer be able to use the Miami River, as I said beginning in 1994, with the current existing build-up.

I brought with me, because a picture is worth a thousand words, and this way I can keep my testimony brief, a couple of pictures

which I want to allow you to see, which show the kind of turbidity which is kicked up every time one of these ships comes up the Miami River which Congresswoman Ros-Lehtinen alluded to.

Every time a boat comes up, these contaminated sediments are kicked up and then washed out into the Biscayne Bay. That is why I say there is a cost involved if we do nothing.

I would hope that the 1986 authorizing legislation which as Congresswoman Ros-Lehtinen points out directs the corps to dredge out the contaminated sediments in the Miami River in essence from shore to shore in Seybold Canal will be effected as quickly as possible because unfortunately, the cost if we don't do anything will be too high to bear.

Again, I want to thank the committee and thank the Chairman, and also my friend from Miami in Dade County for being here with me today.

Mr. NOWAK. Thank you very much for all your testimony. We have had the opportunity to, at Congressman Lehman's invitation, to look directly at the area, when we were in Southern Florida, in going up and down the shipping port area.

I think one gets the impression that this is very different from what is going on at the Port of Miami, and I wonder for the subcommittee record if you could describe the difference in the vessels, and why the vessels would be going, when within physically about a couple of miles, they could go into the Port of Miami, the difference in the economies of scale that are very evident when one sees the type of shipping that is going on between the Miami River and the Caribbean.

Mr. DUSSEAU. I would be happy to, Mr. Chairman.

There is a significant difference between the types of activities which occur at the Port of Miami versus what happens on the Miami River.

The Port of Miami is a major containerized operation. It's large cargos, large bulk shipments coming in and out, being transshipped. It's not the type of shipping which occurs primarily throughout the islands in the Caribbean.

It's also a facility obviously where the ships have a much deeper draft than are capable of going up the river. Many of the ports in the Caribbean are shallow draft ports, 15, 10 feet, and as many of the conferences on the Caribbean Basin Initiative pointed out, one of the major shortcomings and one of the reasons why the CBI has not reached all of the objectives it hoped for was the problem in terms of shipping.

Small cargo sizes, small ships, short routes, it's very difficult problem in terms of providing low cost transportation for manufactured or agricultural goods throughout the Caribbean.

The Miami River provides the outlet for many of those islands and Central American countries, and even going all the way down into South America.

They come in small lots. The items are then—go off to warehouses where they are resorted, even evaluated perhaps, and then shipped on elsewhere.

It's really a different type of activity, different type of vessel, and the charges involved with putting a ship into the Port of Miami are

obviously must higher than they are on the river, the river being much less mechanized than the port is.

For a small ship to go in there and take up that space when it's meant for the types of highly mechanized ships with the big cranes to quickly unload them and get them back out to sea, it doesn't make economic sense for them.

So, unfortunately, we are dealing in two different economic worlds. The First World being the Port of Miami, and the Third World port so to speak in terms of the Central American, Caribbean and of the South American countries using the Miami River as their closest export to be able to bring goods here and take goods back to their countries.

As the debt crisis is resolved in Latin America, there certainly are some signs of that, there will be increased activity in the port area. As the situation in Nicaragua normalizes, there will be significant increases, and there was a delegation, as a matter of fact, the mayor of Hilea, myself, we were all in Nicaragua to try to see how we begin to normalize the situation between our area and Nicaragua.

And as the situation in Cuba changes, we will probably see a dramatic increase in trade coming out of the Miami River.

As all of you know, we have probably 600,000 people in Dade County either born in Cuba or are first generation or Americans of Cuban dissent will be working very hard to see that their island home land returns to, including the Congresswoman sitting next to me, returns to its previous economic viability it had before the Castro Regime.

So it really a different world and has different needs. It's very necessary to the health of the Caribbean.

Mr. NOWAK. One other point I think we should bring to the committee's attention is you made—well, in your written testimony and perhaps you could just expand upon the fact that this Miami River area now, with this shallow draft and every day it rains you get more inputs through your storm water, and you mix that with the moving of cargo up and down that river.

The very sensitive Biscayne Bay area, which is really an estuary by itself, that this river flows into, even as we sit, as they say, your probably receiving contaminated sediments out in that very sensitive estuary, which produces everything from shell fish to a breeding ground for a lot of the commercial fishing and the sport fishing industry that is supported from that Biscayne estuary.

Has this—it certainly hasn't decreased, and I am wondering if the impacts of that have been measured as you have gone through your local studies.

And you had a conference on this particular problem last, I believe it was last June, with the corps to discuss all of this in detail. I wonder if that has in any sense been exacerbated over the last year?

Mr. DUSSEAU. Mr. Chairman, there clearly are visible and identifiable, measurable impacts on Biscayne Bay. Biscayne Bay is a very shallow bay area, probably averaging maybe six feet in depth, and it's very sensitive in that sense and has had something of a—has made something of a come back from some 10 or 15 years ago be-

cause of the efforts to eliminate direct discharge of sewage and other pollutants into it and into the Miami River.

However, the pollutants which are in the river which go back beginning, probably the worst activity began during World War II when the Federal Government itself had facilities for the construction, maintenance of Naval vessels on the river where heavy metals and other sorts of waste materials were dump directly into the river.

And many of those materials are still there lying on the bottom and do occasionally, every time a boat goes up and down, get stirred up.

The channel, where the river goes into the bay, we have been tracking our Environmental Resource Management Department has tracked where some of these heavy metals and major pollutants are beginning to creep further and further out into the bay, and we have tracked it over time and you can see the problem increasing and going out into the bay, which is a fishing are for people of Dade County, major amounts of crab, lobster, and other sorts of fish, seafood are taken out of the bay and consumed locally.

It's in that sense a very real health hazard which once again goes back to what I said earlier, there is a real cost if we do nothing in this particular circumstance.

It has even gotten to the point now, Mr. Chairman, which as you probably know where some vessels can only go into the river now during high tide, and that causes a problem because some of the bridges may not be open during rush hour.

So if the high tide coincides with rush hour, those boats have to sit out waiting for the next high tide, which obviously increases the cost of shipping, which has a negative impact on the economies in the islands where these cargos are coming from and obviously on Dade County itself.

Mr. NOWAK. Bill Lehman had spoken to me months and months ago about this particular problem and the uniqueness of this whole aquifer and the whole estuary when you consider there are other areas in the country where there are toxic hotspots which are sitting, and present no movement problem.

In other words, they are looked at as almost captured in one area, and you don't have the relationship of a lot of movement along with the normal inputs into a section of a river or a port or a harbor that this area presents itself with.

So we want to look at that very closely and see where we can move.

And let me at this time turn to Arlan Stangeland for whatever questions he may have.

Mr. STANGELAND. I thank you, Mr. Chairman.

The Chairman has been fairly concise in his questioning and your responses have been very complete. My only question, I guess, would be, has there been any study on the alternative methods of dredging disposal that could be environmentally sound?

I would expect you have got a real problem there if traffic is swirling up some of these toxic sediments and the river flows are carrying them into the bay. So that if you to dredge, you are going to have even more of those toxic sediments floating into the bay.

While that is only a one-time shot and it's over with once you get it cleaned up, it's got to be a very difficult task to approach.

Mr. DUSSEAU. Initial estimates are that if we were to do strictly maintenance dredging, using clam shell type dredging operation and ocean dumping, in other words, not doing shore-to-shore and eliminating all the sediments, not eliminating all the problem, just doing the canal itself and using clam shell and ocean dumping, which obviously with the—especially some of the hot spots that are there would not be an environmentally sound thing to do, that the cost would be around $12 million if you do the job appropriately.

In other words, clean it up once and for all. And if you take into account the different type of dredging methods, in other words, the suction dredging and probably disposal of at least a portion of land, and if not all in some fashion in terms of making sure that there is no additional pollution coming from the cleaning up operation, the cost estimate right now is around $22 million.

And that is probably what we are looking at in terms of a figure, in terms of following the 1986 Clean Water legislation, which indicated to the Corps to do in essence shore-to-shore elimination of the contaminated bottom sediments in the river itself and its major contributory, the Seybold Canal. So probably $22 million in terms of doing an environmentally safe dredging operation.

Mr. STANGELAND. I have no further questions, Mr. Chairman.

Mr. NOWAK. Mr. Pallone and Mr. Geren?

Mr. GEREN. No questions.

Mr. PALLONE. No questions.

Mr. NOWAK. We have some other questions that we would like to explore, but we will probably do that in writing and get some of the detail and the extent—the locations of the contaminants to see what we can do, as many are starting to look at a broadened, you know, mission for the Corps when they do their regular dredging.

By the way, has it been the last dredging, has it been done within 30 years?

Mr. DUSSEAU. I believe it's been something like that. That has been a good long time for this, since——

Mr. NOWAK. Just over 30 years; is that correct?

Mr. DUSSEAU. I think it has been. I think the Congresswoman had a date, but I think it's been 30 years.

Mr. NOWAK. About 30 years ago.

Ms. ROS-LEHTINEN. Yes, thirty years.

Mr. DUSSEAU. I am told that it really has not been dredged since the original dredging in 1933.

Mr. NOWAK. And we are trying to figure out an appropriate role, especially when you have unique circumstances, which I really do believe, after being given the opportunity of looking at this particular river and the shipping that has been carried on, the economic value of this very large port facility, when you compare it to the impacts it's having on the Caribbean and in fact the people that are employed along this river, it's really irreplaceable.

You are not going to be able to develop a low-cost shipping area and yet we are well aware of all of your concerns, as have been expressed.

The problem's over the environment and what we can accomplish, bring the economic benefits and enhance the environment of this area at the same time.

I know it's been a particularly difficult problem to bring all of these different interests to bear, but I just want to congratulate especially you three for the time, the attention and the information, the input that you have given the subcommittee, and we look forward to getting back to you once we have assimilated all the material and sat down with the corps to see where a viable solution to all this is going to come.

I know no three people who have been more interested in the local dredging problem than you have, and we certainly will keep the lines of communication open with you and hopefully be back to you as we move forward to complete our Water Resources Act in the next few months.

Thank you very much for coming.

[The prepared statements of Representatives Ros-Lehtinen and Lehman follow:]

Testimony of

REP. WILLIAM LEHMAN

before the

SUBCOMMITTEE ON WATER RESOURCES

HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

WEDNESDAY, MAY 16, 1990

Mr. Chairman, I want to thank the Subcommittee for the opportunity to come before you today with my colleague from Miami, Congresswoman Ileana Ros-Lehtinen. Actually, the Miami River is physically located in Congresswoman Ros-Lehtinen's 18th Congressional District, but since it helps drain parts of our 17th District, I asked for this opportunity to come along.

Our concern today is for the Miami River. We would like to discuss the need for legislation to address an immediate problem for shipping and a predictable future problem for our delicate and unique subtropical environment.

When I first came to Miami 30 years ago, we used to fish in the Miami River--and you could even eat the fish you caught. But much has changed today. The river hasn't been dredged in 30 years, and the increased water traffic and runoff from the watershed have done much damage that needs to be corrected.

We come before you today to ask the Subcommittee for help on two major problems: both involve securing the assistance of the U.S. Army Corps of Engineers in dredging the Miami River.

This waterway is of vital commercial importance to our region. But bigger ships are having trouble getting in--and soon they won't be able to get in at all--because the river needs to be dredged to improve navigation.

But dredging the navigable channel leaves in place dangerous sediment on the sides of that channel, the result of pollution from the growth of river traffic and the explosive development in the Miami River basin over the past three decades. This sediment includes oil, chemicals, metals, etc. which were dumped into the river or washed into it from the watershed. It must be removed, even though it lies outside of the navigable channel.

Under present law, the Corps of Engineers is authorized to dredge only for the purpose of improving the navigable channel. We certainly need your help on this aspect of our problem. But we also feel that the law should be changed to authorize the Corps to dredge harmful or dangerous sediments outside the navigable channel.

In other words, we believe the U.S. Army Corps of Engineers should be authorized to dredge the Miami River to improve both navigation and the environment.

Our pressing need in Miami is to make the river safe for both ships and fish. If polluted sediments were to wash into our beautiful Biscayne Bay due to a hurricane or perhaps a stalled tropical depression--and I know that you, Mr. Chairman, know first-hand how hard it can rain in Miami--it would contaminate--possibly for all time--a body of water which is used by millions of people each year.

Mr. Chairman, traditionally, the Army Corps of Engineers has been the arm of the federal government used to assist commerce through improved navigation. I am asking that this same expertise be used to achieve not only that goal, but also the additional goal of protecting our fragile environment.

My colleague, Congresswoman Ros-Lehtinen, will provide the Subcommitee with additional information about the problems we face with the Miami River. I would like to associate myself with her comments.

Thank you for the opportunity to make my case to you today. I hope the day isn't too far off when people can once again talk about the great fishing in a navigable, safe, and clean Miami River.

STATEMENT OF REPRESENTATIVE ILEANA ROS-LEHTINEN
SUBCOMMITTEE ON WATER RESOURCES
HEARING ON CONTAMINATED SEDIMENTS
MAY 16, 1990

I very much appreciate the opportunity to appear before you today so that I may provide you with information regarding the Miami River and to request your support in joining local efforts in South Florida to take timely action to ensure the maintenance of proper clearances for commercial and private vessels to navigate the River in an environmentally sound manner so as to abate pollution and to improve the water quality of the Miami River and hence in Biscayne Bay, the Biscayne National Park and the Biscayne Bay Aquatic Preserve.

Project Background

The Federal role in navigation improvements to the Miami River dates back to 1930, when the Miami River navigation channel was authorized as a Federal public works project. In 1933 the Army Corps of Engineers established the navigation channel by box cutting a channel in the River's underlying rock layer and then dredging a navigation channel fifteen feet deep, of varying width, through a 5.5 mile length of the River.

As early as 1972 Congress went on record to support efforts by the U.S. Army Corps of Engineers "in the interest of navigation, pollution abatement, and other allied water purposes" pertaining to the Miami River. The Corps has periodically

responded to further Congressional directives to assess the navigation and clean-up needs of the Miami River.

The latest Congressional provision for such Corps activity is included in Section 1162 of the Water Resources Development Act of 1986. That Act, which became Public Law 99-662 when signed by President Reagan on November 17, 1986, authorizes and directs the Secretary of the Army to remove polluted bottom sediments from the Miami River and the Seybold Canal.

The Corps of Engineers has undertaken a feasibility report based on the Congressional directive in Section 1162. The draft of the report was made available for circulation and review in December, 1989. The Corps found that no National Economic Development Benefits could be identified for the removal of sediments in the Miami river and Seybold Canal. We in South Florida do not, can not, accept this conclusion of the Corps. Let me take the time to outline for you the importance of the Miami River, and the greater importance of making the investment now, to clean up this vital but polluted asset of South Florida.

The Navigation Role of the Miami River

The river terminals of the Miami River serve a vital function not only to the South Florida economy, but to the economies of several countries of the Caribbean Basin. The Miami River is, arguably, the most important facility available in the

United States for economic and trade ties with these countries due to the fact that many of them have restricted harbor depths comparable to that of the Miami River. Thus there has been a long-established set of trade links, both on paper and on the water, that serve to tie the United States and the countries of the Caribbean Basin together.

I do not doubt that a few of the shippers or terminal operators that currently do business on the Miami River could relocate to the Port of Miami or to some other more distant port in Florida or the southeastern United States. I do know, however, that the shipping interests of many of the Caribbean countries could not afford the rates at the Port of Miami or similar harbors because the economies of scale are not in their favor: these shippers cannot sail any larger vessels into many of the Caribbean ports.

According to data compiled by the Corps of Engineers, the terminals along the Miami River accounted for some 800,000 tons of export cargo in 1986, with a value in excess of $2 billion. The Corps found that the navigation channel is experiencing shoaling at the present time with the calculation that maneuvering width losses average one foot per year throughout the entire River. Already the larger draft vessels must await high tide as well as tug assistance to maneuver in the River.

The draft feasibility report states: "(s)hould restrictive sediments not be removed from the river, channel side shoaling will eventually narrow the vessel maneuvering lane to the point where smaller vessels will have to replace the larger commodity movers on the river. Under this scenario, ever increasing losses will be realized by river terminal operators until they will be forced to cease operations on the Miami River. This will cause major unemployment and a severe loss of revenues for the City of Miami and Dade County.".

Mr. Chairman, the businesses along the Miami River, which were brought into a coordinated effort with other South Florida public and private groups to address the navigation, pollution and water quality issues of the river via the Miami River Coordinating Committee, do not seek any lengthening or deepening of the current navigation channel as established by the Army Corps of Engineers. They seek, rather, to ensure that the port functions of the Miami River continue to be able to function as a vital element in the South Florida and the Caribbean Basin economies.

The Corps of Engineers has, for channel maintenance purposes, divided the Miami River into three sections for analysis. The Corps has concluded that maneuvering room widths will further decrease by five feet in all three sections at a 12 foot depth by 1995, and by an additional five feet by the year

2000 due to shoaling of sediments along the outer edger of the navigation channel. The Corps further concluded that maintenance dredging of the Miami River is warranted, and could be accomplished by clam shell dredging and ocean disposal of the dredged materials.

Environmental Issues Relating to the Miami River

The Miami River, like so many of our water resources, has suffered from our early indifference to our natural resources. Over the years pollutants have entered the river from a number of sources, mainly man-made sources which could be expected to be experienced in an urban river. Efforts to abate the pollution of the river have been underway by a variety of state and local entities in both the public and private sectors.

In addition to industrial and shipping-related pollutants, the local jurisdictions abutting the river discharged storm and wastewater directly into the river. Such actions largely ceased by 1960 when the direct discharge of municipal and county wastewater was discontinued. The river still does receive intermittent overflow as well as pollutants borne by storm sewer outfalls. A county-wide stormwater management utility is currently under study, and many stormwater outfalls should be curtailed in the future as a result. The City of Miami already has a stormwater management utility in-place. Another significant source of pollution has been the site of a World War

II U.S. naval munitions facility on the Miami River.

We also have had significant problems with abandoned vessels. As many of you are well aware, the U.S. Customs Service at one time had as many as 170 confuscated vessels docked in the river. These vessels had a serious negative impact on the river with rusting hulls rupturing and spilling bilge, oil and grease into the river. The Dade County Congressional delegation successfully sought a Congressional mandate for these vessels to be removed. The Customs Service has contracted for such removal, and fewer than 20 confuscated vessels still remain.

Local jurisdictions have put stringent monitoring and clean-up programs into place. The City of Miami has a mooring code to provide for the timely removal of deteriorating or abandoned vessels. A $30 million bond issue by the City of Miami for storm sewer drainage basins has been approved to eliminate outfall pollution into the river. There is a permitting process for dewatering, coastal construction and industrial waste discharges. Fuel leaks have been limited via toxic waste prevention programs. Bilge waste pumpout facilities and marine sanitation devices are in place.

The draft feasibility report prepared by the Corps of Engineers found that most sources of pollution into the Miami River have been reduced, and that fixed point pollution has been

halted. The report does focus on the remaining significant local environmental concern; that is, the persistent presence of pollutants in river sediments. The feasibility report concludes that, while river sediments do contain pollutants (in some cases in excess of standards), the level of sediment contamination overall does not warrant specialized dredging or disposal methods.

We in South Florida do not agree with this conclusion of the feasibility report, and we are thus seeking your assistance in providing the Corps of Engineers with the guidance and resources necessary to provice for the type of environmentally sensitive dredging and disposal necessary to make the Miami River cleaner and, more importantly, to ensure that these polluted sediments are not allowed to enter Biscayne Bay, the Biscayne National Park or the Biscayne Bay Aquatic Preserve.

These fragile, environmentally sensitive areas at the mouth of the Miami River are already subject to ongoing pollution by Miami River sediments due to the fact that vessel props actually dredge the naviation channel each day, thereby suspending the polluted sediments from the channel bottom into the water column as it flows into Biscayne Bay. More frightening than this ongoing pollution process is the potential for an ecological disaster should a hurricane strike in our area with a resulting flushing action in the Miami River which could transport all of

the polluted sediments directly into Biscayne Bay.

The impacts of either the continued sediment transfer or a sudden flushing caused by a hurricane would be devastating on the ecology of Biscayne Bay. We need to act now to stop the constant degradation of the Bay, and to avoid a catastrophic occurance such as can be anticipated if a hurricane should strike. We know that our regulatory actions are not enough to clear the Miami River of pollution or to stop the transport of the polluted sediments into Biscayne Bay. The river sediments are contaminated and will remain so. The sediment must, therefore, be removed and disposed utilizing environmentally safe procedures.

It is imperative that the dredging method used not allow suspension of the sediments, such as would occur with clam shell dredging. Suction dredging is one method which would be environmentally sound. Similarly, the plan and budget should provide for upland disposal of the dredged contaminated sediments rather than ocean disposal.

We must move expeditiously to develop the most environmentally sensitive dredging and disposal plan possible in order to ensure that the partnership of local, Federal and Congressional entities which have a responsibility for the stewardship of our economic and environmental resources, act as

quickly and as responsibly as possible to protect the ecological, recreational, and economic well being of the Miami River and Biscayne Bay.

Closing Comments

We know that we have a problem with contaminated sediments in the Miami River. We know that these contaminated sediments are being flushed into Biscayne Bay. Congress has responded in the past to Dade County's concerns regarding the Miami River, but all of these efforts have not been sufficient to mobilize and coordinate local and federal resources to properly address the need to clean up the Miami River. We all seek to clean the river of the accumulated toxic sediments. I would urge the Subcommittee to expand and clarify the role of the Army Corps of Engineers so that we can proceed expeditiously, in an environmentally sound manner, with the clean up of this vital natural resource in South Florida while ensuring the continued protection of ecology of Biscayne Bay.

Mr. NOWAK. Our next witness is a Member of the subcommittee, Mr. Pallone, and I don't know if he wants to formally take the table and present to the subcommittee for the record his testimony that I know that he has worked very hard on concerning some problems in the New York/New Jersey area.

TESTIMONY OF HON. FRANK PALLONE, A REPRESENTATIVE IN CONGRESS FROM THE STATE OF NEW JERSEY

Mr. PALLONE. Thank you.

Thank you, Mr. Chairman.

Mr. NOWAK. Mr. Pallone.

Mr. PALLONE. Mr. Geren said he would rather have me sit down there so he can quiz me. I just want to express my concern, Mr. Chairman and Members of the subcommittee, regarding the disposal of contaminated sediments and the need to develop national sediment quality criteria.

And I always want to mention the importance of my amendment, which is now section 210 of the Coastal Defense Initiative, which was approved by the Committee on Merchant Marine and Fisheries just a few weeks ago.

My amendment would repeal section 211 of the Water Resources Development Act of 1986. My concern over the issue of contaminated sediments is basically the long-term health effects of persistent bioaccumulative chemicals contaminating seafood.

And you mentioned, Mr. Chairman, in your opening statement the National Resources Defense Council's 1989 report on contaminated marine sediments which concluded that sediment contamination is widespread throughout the United States coastal waters and potentially far reaching in its environmental and public health significances.

I encourage further studies to determine the long-term effects of consuming contaminated fish on both humans and marine life.

On the national level, we must develop strict sediment quality standards for the Great Lakes, our inland waterways, and our coastal waters.

And the EPA should first present to Congress, in my opinion, the most stringent set of quality criteria for the management of dredging materials. And the Congress should challenge the agency, the EPA on the criteria protectiveness before we establish a standard.

What I mainly want to address today is section 211 of the Water Resources Development Act, which addressed the need for an alternative to the current mud dump site located approximately six miles off the coast of my district.

The EPA was required to designate, pursuant to that provision, one or more new disposal sites no less than 20 miles from the shoreline.

I recognize that we must continue to provide disposal sites for the immense quantity of material removed from the New York/New Jersey Harbor. However, the answer, in my opinion, in not arbitrarily moving the disposal site further offshore.

The EPA has nearly completed its study to determine a new site at least 20 miles offshore and has testified before various House

subcommittees that it appears unlikely that a suitable site can be found at this distance.

With this in mind, I think we must focus on better management of current sites, implementing ways to apply decontaminating technology, and beginning a demonstration project to promote environmentally sound alternatives to ocean disposal.

And this is basically what my amendment calls for. My amendment authorizes the corps and the EPA to develop a long-term management plan for the disposal of dredged materials for the New York/New Jersey Harbor region, and this long-term plan must include measures to reduce the amount of contaminants and materials proposed to be dredged through source control and decontamination technology.

It also requires the EPA to identify the source quantities and characteristics of materials to be dredged, measures to reduce the quantities of dredged materials for ocean disposal, and a program for monitoring the physical, chemical and biological effects of dumping dredged materials at the mud dump site.

One area of particular importance to me is decontamination technology. Presently the twin weaknesses of decontamination technology are cost and time, but the incredible volume of material which needs to be effectively disposed of has deterred progress on this technology.

Regardless, it must force the issue and begin, even if on a small level, to develop some of the technology which now exists and to work out ways which can increase the capacity for handling these materials.

My amendment also authorizes the demonstration project for disposing on an annual basis up to 10 percent of the material currently dredged in an environmentally sound manner other than by ocean disposal.

Of course, I encourage the use of decontamination technology as the preferred alternative. I have also included a provision in the amendment which seeks to assure that only dredged material that meets the criteria of section 102A of the Marine Protection Resource and Sanctuaries Act may be dumped at the mud dump site.

This eliminates the waiver provision authorized in section 103D of the same Act. Although the waiver provision has not been implemented in the New York/New Jersey Harbor area, the EPA is revising its testing standards, as you know, and new testing criteria may eliminate the ocean disposal option for some contaminated material. This could lead to use of the waiver provision.

My purpose in adding this provision is to assure that highly contaminated materials are not ocean dumped. Mr. Chairman, I will just conclude by saying that I believe that my amendment offers a positive and realistic solution to the disposal problem of my congressional district.

You know, because of the hearing that you held in my district last year that this is a major problem in my area, and I want to thank you and the committee for bringing this subcommittee to the district to look into the problem.

This subcommittee's support for my amendment as reported by the Merchant Marine and Fisheries Committee is important, and I

look forward to working with you and the other Members of the committee as we proceed with this issue.

Thank you, Mr. Chairman.

Mr. NOWAK. Thank you very much, and we are very well aware, because of your work concerning this issue and the mud dump site, and certainly are going to take a good, long look at your amendments to the Act and see if we cannot put together a change which environmentally takes care of that problem and certainly makes sure that we do everything we can with the technology that you speak of.

There is some different technology being used now in the Great Lakes, and I don't know how much of that will be transferred. But that is one of the things that we want to take a further look at as we develop your language to see that we upgrade as best we can the existing technology to provide a really cost-effective way to handle that decontamination where necessary.

And we will be happy to work with you and look forward to the next several months of improving the total response.

[Mr. Pallone's prepared statement follows:]

TESTIMONY OF
REPRESENTATIVE FRANK PALLONE, JR.

BEFORE THE SUBCOMMITTEE ON WATER RESOURCES

COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

MAY 16, 1990

Mr. Chairman, I would like to express my concern regarding the disposal of contaminated sediments and the need to develop national sediment quality criteria. I am also want to mention the importance of my amendment, now Secion 210 of the Coastal Defense Initiative, approved in the Committee on Merchant Marine and Fisheries. My amendment repeals Section 211 of the Water Resources Development Act (WRDA) of 1986.

My concern over the issue of contaminanted sediments is basically the long-term health effect of persistent bioaccumulative chemicals contaminating seafood.

In fact, the National Research Council's 1989 report on contaminated marine sediments concluded that "sediment contamination is widespread throughout the United States coastal waters and potentially far reaching in its environmental and public health significance. I encourage further studies to determine the long-term effects of consuming contaminated fish on both humans and marine life.

Our handling of the disposal of contaminated sediments thus far may be economically prudent, but in terms of environmental protectiveness our actions have been deplorable.

On the national level, we must develop sediment quality standards for the Great Lakes region, our inland waterways and our coastal waters. Secondly, we must recognize and address the danger of disposing contaminted sediments.

The EPA must present us with the most stringent sediment qulaity criteria for the management of dredged materials, and the environmental community must challenge this agency on the criteria's protectiveness before we establish a standard.

Section 211 of the Water Resources Development Act of 1986, addressed the need for an alternative to the current mud dump site located approximately 6 miles off the New Jersey shore. The Environmental Protection Agency was required to designate one or more new disposal sites no less than 20 miles from the shoreline.

I recognize that we must continue to provide a disposal site for the immense quantity of material removed for the New York/New Jersey Harbor region. However, the answer is not arbitrarily moving the disposal site further offshore. The EPA has nearly completed its study to determine a new site at least 20 miles offshore and has testified that it appears unlikely that a suitable site can be found at that distance.

With this in mind we must focus on better management of the current site, implementing ways to apply decontaminating technology and beginning a demonstration project to promote environmentally sound alternatives to ocean disposal. My amendment calls for these actions.

My amendment authorizes the Army Corps of Engineers and the Environmental Protection Agency to develop a long-term management plan for the disposal of dredged material for the New York-New Jersey Harbor region. This long-term plan must include measures to reduce the amount of contaminants in materials proposed to be dredged from the harbor through source controls and decontamination technology.

It also requires the EPA to identify the source, quantities and characteristics of material to be dredged, measures to reduce the quantities of dredged materials proposed for ocean disposal and a program for monitoring the physical, chemical and biological effects of dumping dredged material at the Mud Dump site.

One area of particular importance to me is developing decontamination technology. Presently, the twin weaknesses of decontamination technologies are cost and time. The incredible volume of materials which needs to be effectively disposed of has detered progress on decontamination technogoy. Regardless, we must force the issue and begin, if even on a small level, to develop some of the technology which now exists and to work out ways which we can increase the capacity for handling these materials.

My amendment authorizes a demonstration project for disposing on an annual basis up to 10% of the material currently dredged in an environmentally sound manner other than by ocean disposal. I encourage the use of decontamination technology as a preferred environmentally sound disposal alternative.

I included a provision in my amendment which seeks to assure that only dredged material that meets the criteria of Section 102(a) of Marine Protection, Research and Sanctuaries Act may be dumped at the Mud Dump site. This eliminates the waiver provision authorized in Section 103(d) of the same Act.

Although the waiver provision has not been implemented in the New York/New Jersey Harbor area, the EPA is revising its testing standards. New testing criteria may eliminate the ocean disposal option for some contaminated materials. This could lead to use of the waiver provision. My purpose in adding this provision is to assure that highly contaminated materials are not ocean dumped.

Mr. Chairman, I believe that my amendment offers a positive and realistic solution to the disposal problem off my Congressional District. I thank you and this Committee for its consideration of these issues in its hearing last year in New Jersey. This Subcommittee's support for my amendment as reported by the Merchant Marine and Fisheries Committee is important and I look forward to working with you on the issue.

Mr. NOWAK. Let me now invite to the witness table our environmental organizations who have played a large role in redefining both the 1986 and 1987 act as it finally was passed, and more and more detailed work in this area and certainly have pursued looking at the review as an opportunity to move the program forward.

We want to welcome before the committee, the Coast Alliance, Beth Millemann, who is executive director. From the Sierra Club, Brett Hulsey, who is a contaminated sediments specialist in the Midwest Office. And from the Environmental Defense Fund, Sarah Clark, who is a staff scientist.

TESTIMONY OF BETH MILLEMANN, EXECUTIVE DIRECTOR, COAST ALLIANCE; BRETT HULSEY, CONTAMINATED SEDIMENTS SPECIALIST, MIDWEST OFFICE, SIERRA CLUB; AND SARAH CLARK, STAFF SCIENTIST, ENVIRONMENTAL DEFENSE FUND

Mr. NOWAK. We will take your testimony as totally incorporated in the record and let you go ahead as you so desire.

Beth, if you would like to start your testimony.

Ms. MILLEMANN. Thank you. My name is Beth Millemann, and I am executive director of the Coast Alliance, a national coalition of activists who work actively to protect the resources of all four of America's coasts—the Great Lakes, Gulf of Mexico, Atlantic and Pacific Coasts.

The Coast Alliance has been working very closely with a coalition of organizations around the country to develop a statement on the need to come up with legislation to deal with contaminated sediments, and this statement, which we call our "Citizens Charter", was released last January.

The 235 organizations around the United States, including labor unions, sport fishing, commercial fishing, hunting organizations and environmental and health organizations signed on to this statement, call for legislation such as is contemplated by Mr. Nowak and this subcommittee, so we are very pleased to have the opportunity to testify here today and talk more about this substance of what is necessary in that legislation.

As you indicated earlier, Mr. Nowak, the recent National Research Council report did indicate that every major harbor in the United States may be considered to be contaminated, which illustrates the fact that the experiences that were shared on the previous panel from the Floridians are unfortunately the rule and not the exception.

The fact that a 1987 study done for the EPA concluded that it is likely that contaminated sediments occur in all water bodies and not just harbors points to the need, in fact the urgent need, to create a national program to address this pollution problem.

A couple of areas that I would like to focus my comments on today concern the public health threats from contaminated sediments and the threats to the environment, and then also the development of new decontamination and alternative technologies, where they are developmentally and what they may promise us in terms of relief from contaminated sediments.

As you know, polluted in-place sediments affect at least two broad arenas, the aquatic environment and migratory fish or resident fish and shellfish, birds and other animals, and human health. Obviously different contaminated sites pose different threats based on the toxicity, extent, and variety of the pollutants. Some sites pose immediate threats and others are supposed to contribute to long-term health impacts.

Regardless of whether the threat is immediate or long-term, the 1989 National Research Council report discusses some of the threats stating that accumulation of contaminants from marine sediments can cause death, reproductive failure, growth impairment, or other detrimental changes in the organisms exposed to these contaminants. According to July 1989 tests from the National Oceanic and Atmospheric Administration, levels of metals, mercury, selenium, and lead appear to be increasing nationally in the analyzed specimens.

For example, looking at specific regions, NOAA found that the Hudson-Raritan estuary and other New York sites showed increasing levels of chromium, copper, mercury, and nickel. In the Mississippi Sound and in Marina del Rey near Los Angeles, NOAA found that levels of DDT in mussels, despite a ban on its use since 1973, are actually increasing.

In its other 1989 report entitled "Great Lakes, Great Legacies?" the Conservation Foundation and the Institute for Research for Public Policy offered ominous evidence of population impacts from exposure to contaminated sediments. For example, the report found that bald eagles along the shores of the Great Lakes do not reproduce as well as those eagles who live inland, that such problems, in fact, are not unique to bald eagles.

Other fish eating birds and animals at the top of the food chain showed similar problems. They found that many species of fish no longer survive in the waters of the Great Lakes, and that, in fact, new varieties of fish introduced into the Great Lakes are having a similar problem with surviving and humans have been warned not to consume even the new species because of their concentration of contaminants. The National Research Council report therefore pointed to the threats to human health posed by exposure to or consumption of contaminated sediments.

In addition to the carcinogenic nature of many of the contaminants, reproductive failures and impairments come with exposure to humans by contaminated sediments. That exposure can come oftentimes through the food chain. A study done for EPA in 1987 found numerous examples of cases where fish consumption warnings or bans were issued because of fish found with pollutants such as PCBs, mercury, dioxin, and kepone attributable directly to exposure to the sediments, not to other exposure routes.

But the most disturbing impacts have been documents in Great Lakes residents. According to the National Research Council report, a study was conducted in 1976 on the exposure of humans to PCBs through consumption of fish from Lake Michigan. Lake fishermen, who as a group consumed more than three times the national average of fish, showed an increase in PCB with the increased fish consumption.

A later study done in 1984 looked at the effects of toxins due to the food chain again. This time they looked at infants born to mothers who had eaten fish while the mothers were pregnant. The babies were smaller in full size, had a reduced head circumference and had problems with neuromuscular maturity. Because of these and other problems, their physicians classified these infants in the quote "worrisome" neonatal category.

Closer to home, the Chesapeake Executive Council reported that the District of Columbia last year issued a health advisory to consumers in 1989 because of high levels of PCBs and chlordane found in catfish, carp, and found in our local Washington waters. Of course, exposure to toxins has contributed to the decline of the fabled Chesapeake Bay oyster fishery.

Out in Washington's Puget Sound we found a high prevalence of cancerous liver tumors, as high as 24 percent of the fish found in the Puget Sound and also in Boston Harbor. Unfortunately not just fish carry contaminants from sediments, and equally unfortunately more than babies, mothers and fishermen are affected by these toxins.

In several cases Great Lakes ducks, who are widely hunted by sportsmen, have been found to contain 60 times the level of PCB contamination as poultry sold in grocery stores.

These health problems are immediate and they are real, and that is one of the reasons that environmental groups around the United States, along with commercial and recreational fishing groups, hunting groups, and public health groups have joined together to urge Congress to move forward legislation that would address the problems posed by contaminated sediments. We have asked for many steps to take place, the most fundamental being the promulgation of criteria and standards that are protective of the environment but most importantly protective of human health.

When we look at the problems posed by sediments, the response might be to say it is overwhelming, but interestingly enough the EPA is undertaking some pretty exciting research on innovative and emerging technologies to treat sediments, not just face us with the option of whether we dump it at the sea, which is not appropriate, or whether we dump it on land, which is often not appropriate.

As proof of that, the EPA is convening the first of its kind workshop next month in Cincinnati, Ohio, which the Coast Alliance and Environmental Defense Fund and Sierra Club have been invited to attend that is going to bring together all their scientists in the Great Lakes national program office and also in their Superfund program to discuss the innovative technologies that are being developed through those two arms of the EPA.

For example, they are going to be looking at extraction technologies, low-energy solvent extraction processes, biological and chemical treatment, low-temperature thermal oxidation and mobilization technologies, and other emerging treatments. Some of these treatments have shown great promise. For example, in the Sheboygan, Wisconsin, site, we have PCBs as high as 4,500 parts per million, and technologies have been applied there that show promise for rendering some of these soils less harmful or ultimately harmless.

Given the potential to have strong steps taken forward to undertake decontamination of these sediments, the Coast Alliance and other groups support legislation that would urge that go forward.

I would like to conclude today by pointing out to this subcommittee the presence of bills I am sure you are all aware of that include components on contaminated sediments that citizen groups across the country strongly support. For example, the Subcommittee Chairman's own bill, H.R. 4323, but also Representative Studds' Coastal Defense Initiative, H.R. 2647, which was voted out of the full Merchant Marine Committee last month and sent to this committee for consideration.

We are particularly pleased with Mr. Pallone's amendment to that bill and the important steps that it would move forward to deal with contaminated sediment disposal in the ocean and the continuation through new sources of contaminants on the sediments.

In the Senate, Senator Mitchell's Coastal Protection Act of 1990, S. 1178, is due to be marked up next Tuesday, and we are of the understanding that Senator Moynihan is going to offer an amendment to that that would, among other things, require EPA to conduct a survey of contaminated sites and to jointly undertake with the Army Corps of Engineers sediment restoration projects.

We applaud these steps forward. We endorse these legislative initiatives and strongly urge the movement forward of coastal pollution legislation in this Congress; 1990 is a rare confluence of events. It is an election year, as we all know, not only for Congress but for many important gubernatorial positions. It is also a redistricting year, and it is the avowed year of the environment. The Coast Alliance and citizen groups around the United States strongly urge this committee and this Congress to take advantage of these opportunities and move forward coastal legislation this session.

Thanks very much for the opportunity to testify.

Mr. NOWAK. Thank you very much.

We will now turn to the Sierra Club, Brett Hulsey.

Mr. HULSEY. Thank you very much, Mr. Chairman. We would also like to thank the committee, Mr. Stangeland, Mr. Pallone, and Mr. Geren for holding this hearing and for showing a leadership role in contaminants.

My name is Brett Hulsey. I direct the contaminated sediments program for the Sierra Club. I am here before you today to urge that this subcommittee swiftly enact comprehensive Federal legislation to control and remediate contaminated sediments. I am also speaking on behalf of the Lake Michigan Federation and Great Lakes United. Together we represent over 750,000 people nationwide and over 200,000 people in the Great Lakes.

The Sierra Club has made the contaminated sediment issue a priority in the last several years through our Great Lakes Washington Weeks, and we also have a contaminated sediment article from the last issue of our Sierra magazine that is included in my testimony.

Toxic muck is one of the Great Lakes priorities for the Sierra Club, Great Lakes United, and the Lake Michigan Federation. In

January we participated with a Citizens Charter that Ms. Millemann referred to earlier.

In March we released the Great Lakes Federal agenda for the 1990s to provide targets for Congress to come into compliance with the Great Lakes water quality agreement. In the agenda we recommended an action of comprehensive contaminated sediment control legislation.

In addition to new legislation for sediments, there are several other actions the Members of this subcommittee might take. We thank you for leading the effort on Section 118 of the Clean Water Act, and I am happy to report that the ARCS program, assessment and remediation of contaminated sediments, is being implemented by EPA and the Corps at this time. We are making major progress in Buffalo River, Sheboygan Harbor, as Ms. Millemann referred to, Indiana Harbor and Saginaw River.

Also, the Chairman's Great Lakes Water Quality Improvement Act and Fish and Wildlife Restoration Act are both steps forward to reach and comply with the Great Lakes Water Quality Agreement. They provide much needed deadlines focus and resources for additional Great Lakes restoration.

As you can see from the map over here, we have quite a bit more than just five sites that need to be cleaned up. We are up to 43 areas of concern now, and these bills will provide desperately needed resources to move forward in those areas.

There is also an upcoming vote on the Clean Air Act which appears unrelated at first to the sediment issue, except when you realize that up to two thirds of the PCBs in Lake Michigan come from the air, and Members may vote for strong permit section, clean auto and fuel section, and the coastal protection sections of the upcoming Clean Air Act to slow toxic deposition into the lakes.

But the issue of paramount importance today is contaminated sediments. That is because of the ecological state of our fresh and saltwater coasts. As you know, toxic sediments impede the beneficial uses in these areas of concern in all but one of them. Moreover, the EPA's recently published March 1990 National Water Quality Inventory documents that only one of every 12 miles of Great Lakes shoreline complies with the goals of the Clean Water Act. That is, only one in twelve miles are fishable and swimmable.

It also says that only one in three miles of the shoreline meets the fishable goal, and this basically means that the majority of our Great Lakes coasts are neither fishable nor swimmable. The reason for this? The EPA says the main reason for these restrictions is contaminated sediments of toxic chemicals such as priority organics. This shows the need for a broader program in the Great Lakes and also in the saltwater coasts.

The problem of toxic sediments and toxic fish came to a head last year when controversy erupted over the renewed health advisories from eating Great Lakes fish, especially those in Lake Michigan. The effects of these advisories are still being felt in the sport and commercial fishing industry, and that is important that they be felt, as Ms. Millemann said.

We do have human health effects already being recorded. There has also been considerable loss of jobs due to harbor closings and

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also a possibility of more job loss through avoidance of charter fishing this summer.

Of course, two years ago we had Boston Harbor and medical wastes grip the country, and that demonstrates the high level of public concern for clean coasts. We hope this summer we will be able to read that Congress has taken strong action to rid our coasts of contaminants.

Mr. Chairman, over the past four years many experts have testified before your subcommittee to the effects of the poison on Great Lakes organisms. Research quantifies the extent of the contamination but indicates that it may actually be worse in the Great Lakes than previously thought. As I said before, this research indicates that one third of the PCBs in Lake Michigan are from contaminated sediments. Those are of course the main problem in fish contamination. We need numerical criteria and a comprehensive program to clean up more than just the Section 118 target areas, but the other target areas in the Lakes.

I also have with me today, and I have included in the record a letter from Great Lakes sport fishing and environmental organizations calling for swift action on this sediment criteria.

It appears that we will not have effective cleanup of our waters and fish in this century unless we get this legislation soon, and I think the Citizen Charter spells out a good way to achieve that. That is through development of sediment quality criteria requiring the states to develop and enforce these uniform standards, conduct a national inventory of the sites in both fresh and saltwater, and provide much needed funding for the program.

This subcommittee has made great strides to protect our coasts, but the fate of the Great Lakes still hangs in the balance. As we begin the 1990s, one must wonder if American children born today will ever be able to drink our water, eat our fish, swim our shores, or breathe the air without wondering if they are safe.

We urgently request this subcommittee to develop and introduce a contaminated sediment bill to cover the points in the Citizens Charter. Moreover, we would appreciate your leadership in getting this passed in this Congress if possible. We from the Great Lakes think this would be a great vote for healthy children, clean cities and coasts and safe fish. Please continue your leadership to restore the Lakes.

Thank you.

Mr. NOWAK. Thank you very much. We will now hear from Sarah Clark.

Ms. CLARK. Thank you, Mr. Chairman. Thank you for inviting me here today to speak to you on the subject of sediment quality criteria and standards.

My name is Sarah Clark. I am a staff scientist with the Environmental Defense Fund, which is a national nonprofit environmental advocacy organization with over 150,000 members. We have been working closely with the Coast Alliance and other environmental groups around the country, including the Sierra Club, on the issue of contaminated sediments, and are extremely concerned about the need for Federal attention to this issue.

I don't think it is any secret that contaminated sediments is the sleeping giant of surface water quality protection. If steps are not

taken to remedy contaminated sediments and prevent their occurrence, all efforts to restore our nation's waterways is going to be in vain.

New Bedford Harbor, the Hudson River, and the Great Lakes are all victims of the fact that sediments are the final resting place for almost all pollutants that enter surface waters. In spite of widespread and persistent accumulation of pollutants and sediments, which has been well-documented by Federal and state agencies, there is today no consistent uniform system for assessing what level of risk such accumulation can pose to the aquatic environment.

We do know from experience that pollutants can accumulate in sediments to a point where aquatic organisms, the environment and human health are severely impacted. There have been and will continue, as long as nothing is done about it, numerous instances of fish and shellfish consumption warnings or bans due to contamination by various toxic pollutants because of their release by sediments back into the water column.

But despite the evidence of deleterious impacts caused by contaminated sediments, there is no system in place for assessing at what point the concentration of a pollutant begins to threaten the aquatic ecosystem. No baseline is available to judge which sediments are accumulating pollutants that potentially threaten the environment of public health.

In short, we do not know what levels of contamination and sediments are safe nor what level poses a risk to the environment until it is too late. Water quality criteria and standards alone cannot protect plants and animals that depend upon our nation's waters, and pollutants are accumulating in sediments even when the concentration of a pollutant is at or below its water quality standard.

Through research conducted by the Environmental Defense Fund for a forthcoming report on heavy metals in the Hudson River and estuary, we found that despite the fact that the water quality standard for chromium, which is the only one that is not vastly exceeded by ambient water concentrations, chromium concentrations in the sediments do greatly exceed the sediment threshold value that EPA developed to screen sediments during their 1987 survey.

Sediments are not considered when the fate of pollutants from point and nonpoint sources are determined, and they are certainly not considered when the waste load allocations are developed or discharge permits are written. Existing water pollution control measures are not adequately protecting against the eventual contamination of sediments, and thus pollutants are building up unabated in sediments in all types of waters throughout the country.

Preventing the formation of new hot spots and avoiding the expense of cleaning up highly contaminated sites is precisely the role of sediment quality criteria and standards that it will play in water pollution control strategies. Without sediment quality criteria, future underwater Superfund sites are going to be created while existing water quality regulations stand idly by.

EDP believes EPA needs to put additional resources to strengthen its current effort to establish a coordinated set of sediment quality criteria and standards and to make that effort a much higher priority. For this reason, Congress can make a valuable contribu-

tion by giving EPA the mandate it needs to develop sediment quality criteria and standards under a defined time frame so that they are effectively used by various regulatory frameworks that encompass both marine and fresh waters.

These frameworks include defining the need to clean up hot spots, defining what dredged material is safe for open water disposal and requiring stricter water pollution control measures through point source permits and nonpoint source abatement programs to prevent future sediment contamination.

The issue of defining what dredged material is safe is extremely important. Considering the polluted state of many of our urban harbors, including those in Boston, New York, Baltimore, San Diego, Los Angeles, and San Francisco and Seattle, are we assured that the disposal of millions of cubic yards of dredged sediments is truly not endangering the environment? The answer is no.

The degraded state of dredged disposal sites, of which the mud dump site off of the coast of New Jersey is just one example, bears witness that dredging does transfer contaminated sediments from one place to the other. EDP believes that the current system used by the corps and the Environmental Protection Agency to evaluate dredged material for open ocean disposal are wholly unsatisfactory and flawed, which I have gone into some detail in my written testimony.

Even though the corps and EPA have recently revised its testing protocol, the adverse effects caused by open water disposal of sediments is still going to continue. The revised testing protocol is intended only to codify ongoing practices. It does not break any new ground by requiring the corps districts to use substantially different procedures.

The revised testing manual does not ensure that a consistent set of criteria will be used throughout the nation to assess dredged material, and most importantly, the corps and EPA's testing guidelines is not substitute for a uniform set of numeric criteria and standards that should be incorporated into the decisionmaking process for dredged material disposal.

Current coastal protection legislation under consideration by the House and the Senate do take steps to achieve the objective of mandating the development of the sediment criteria and standards and applying their use in regulatory decisions.

The Coastal Defense Initiative is an important measure that among other things calls for the development of sediment quality criteria by EPA and standards by the states. This bill, the CDI's amendment—the amendment offered by Congressman Pallone will also vastly improve the management of the mud dump site which is urgently needed. Both Senator Mitchell and Senator Moynihan's bills are also important pieces of legislation that have merit with respect to contaminated sediments and how they are managed.

EPA strongly supports the intents of all these bills and urges the House Public Works and Transportation Committee to study their elements and consider them as possible complements or additions to the Coastal Defense Initiative. It is extremely important that coastal protection legislation include provisions that set the goal of ending open water disposal of contaminated sediments, mandate the development of sediment quality criteria and standards, and re-

quire the accommodation of such criteria and standards in regulatory decisions.

The Environmental Defense Fund urges this committee and the subcommittee to work towards achieving passage of coastal protection legislation this session. It is imperative that Congress not lose the opportunity to start changing how contaminated sediments are assessed, categorized, managed, and most importantly prevented from occurring in the first place.

Thank you.

Mr. NOWAK. Thank you all very much for your testimony. We have talked about, the last couple of days, looked at using a sediment criteria for so-called effect-based testing, looking at dredged material and other bottom sediment for disposal, and I wonder if you could comment on whether we have a situation here where perhaps both would have a role in trying to define what is "contaminated sediment" and how it is to be handled in the future.

Ms. CLARK. If I may comment, I think that once numeric criteria and standards are developed, in terms of deciding how they should be used to assess dredged material, I believe that they should be used in conjunction with biological tests to assess the effect of those sediments on organisms, but they should be used in conjunction with bioassays.

And I believe that is some of the thought that the Environmental Protection Agency has right now about how to use those numeric criteria once they are developed.

Certainly numeric standards don't have to be used alone without any other kinds of biological tests. I think some sort of system should be developed to use both together.

Mr. MILLEMANN. The Coast Alliance, too, feels it's very important to have numeric criteria that acts as cut-off points. There has been some discussion that criteria should be transformed into some kind of a flashing yellow light. If the criteria, if that cut-off point is exceeded and that exceedance of the criteria would then trigger review, it's our strong feeling that that is not only inappropriate for sediments but that would set a very bad precedent for Clean Water Act criteria and criteria in other media of the environment.

We also feel along with numeric criteria there should be the biological testing, the bioassay testing, so that you get a full range of information about what the organism is experiencing, as well as just the quantity of what the organism is being exposed to.

Mr. HULSEY. Mr. Chairman, it's also important because of the biomagnification potential of these materials that you consider that the test be—the numerical limit that is established be low enough to ensure that whatever is going to bioaccumulate, whether it's lake trout or turtles, as in the Buffalo River, have a relatively low enough level that they don't—they are not imperiled.

So that is why bioassays are important.

Mr. NOWAK. We were just talking about what additional resources we are going to have available, and while we are trying to find standards and so forth, we have been also aware that throughout the Great Lakes that you have mentioned, there are RAP processes going on. And a couple have been concluded locally, but I don't think approved entirely by the IJC.

And while that is moving forward, we—looking at least in Waukegan where a part of that harbor area was designated a Super-Fund site, and under a consent order, I believe, the corporation that was responsible is paying X amount of dollars for that clean up of that portion that was designated, while the corps is doing other work, the regular dredging in that harbor, and they are keeping it separate.

One of the things that we have suggested is that to get some movement in this area somebody who has the responsibility for the navigation dredging could also assist in the environmental cleanup.

And that in our world happens to be the Corps of Engineers. Also, take a look at when they are doing that, when the areas have been delineated to also pick up and/or remediate and/or land fill, depending upon the particular case, some of these areas where you have isolated acres, perhaps, in one area of a four- or five-mile stretch and you only have ten acres, I suppose, that can be identified.

And I am wondering what you thought about the corps mission being broadened to accomplish that.

Mr. HULSEY. Mr. Chairman, the Moynihan Bill has an interesting way of dealing with that. Without really broadening the corps' mission, they just say, I think it allows the corps to look within 2,500 feet of the navigation channel to deal with the contaminated material, so that gives them a little broader scope to go after these contaminants while not turning them loose entirely.

The Moynihan Bill also sets up a partnership between the corps and the EPA. The EPA does criterion standards, and the corps does the work.

We recognize that the corps is probably the best agency to do the actual dredging and may be also able to develop remediation technologies in an efficient fashion, so we might be able to get around that without entirely changing the mission of the corps, broadening it too much.

Mr. NOWAK. The dollars that the Moynihan Bill looks for, I understand, is from the Harbor Maintenance Trust Fund; is that correct?

Mr. HULSEY. Yes.

Mr. MILLEMAN. Yes.

Mr. NOWAK. And the port authorities will speak to their view of that next, but I have an idea of what they are going to think about the Moynihan proposal to raise those funds.

Mr. MILLEMAN. But the Moynihan proposal is predicated on President Bush's suggestion that the Harbor Maintenance Trust Fund be greatly increased and on Senator Chafee's proposal that the Money, the legislative proposal to implement President Bush's directives, so the Moynihan proposal would take, I think, .08 percent of that proposed increase and devote it towards harbor clean-ups in contaminated areas.

Mr. NOWAK. Well, clearly you have touched a central point here of how we are going to finalize the standard of what is contaminated. The testing has gone on, some of these areas have found, and I think they developed, as our friend from New Jersey suggested, new technology to be able to detect in place underwater levels of certain chemicals.

And once that identification is made, of course, you can isolate where the contamination lies. And we are hoping that starts to give us a much faster track in finding a solution.

And then, of course, once you have got the locations, you devise the best possible method for earth carving or removal or any other alternatives that can be agreed upon by the local community and find a way, of course, to finance it.

As we are going through all this, one of the sections of the Water Pollution Control Act, Section 115, in broad terms already identifies and directs the administrator of EPA to identify locations of those in-place pollutants with emphasis on toxic pollutants in harbors and navigable waters and has authorized acting through the Secretary of the Army to make contracts for the removal and appropriate disposal of such materials from critical ports and harbor areas.

The act authorized $15 million. That, of course, has not been used, and I wonder if you see any value in retaining that section in the act.

Mr. MILLEMAN. That was an issue that EPA has brought to the attention of environmental groups and other groups elsewhere, particularly at the very good conference that EPA and the Lake Michigan Federation hosted in December of 1988, and that you were a speaker at. I think it was December of 1988 in Indiana.

That section, as you said, has never had appropriations. It has always been authorized. We think that would provide a good first step towards some of this identification and remediation activities that should be taking place.

We don't think it's sufficient in its scope to deal with all contaminated sediment issues, but it would certainly be useful to have that section funded as it does provide good direction to the EPA.

Mr. NOWAK. I would think, you know, we are going to start looking maybe to broaden that section, to get it funded because you are going to be looking for resources to do this searching work.

If we are going to have an inventory which I think certainly the subcommittee is looking for all over the country, including those areas that have already been researched, you are going to need substantial dollars to do that, and very clearly section 115 says to identify the location of in-place pollutants.

Am I missing something?

Mr. HULSEY. Mr. Chairman, we think perhaps EPA may have been missing something. We have seen a turnaround at EPA over our meetings on one their high priority—it has become a task force level, and I guess the assistant administrator has been Habicht is heading up the Great Lakes sections.

I think the EPA has started to address as to their processes, but comprehensive sediment legislation would develop—I mean, they are staring to pay attention, but I think if we get the comprehensive legislation. They will not be able to duck the issue.

Mr. NOWAK. Well, thank you very much for attending once again and for all your work in this area. We will certainly be going forward with all of this when we start to put the pieces together, so hopefully we can form a whole mosaic in this area. We may want to get back to you. Let me now turn to Mr. Pallone for questions he may have.

Mr. PALLONE. Thank you, Mr. Chairman. I just wanted to comment, if I could, on what Ms. Clark said. It was particularly interesting, I thought, the way you described how the effects based approach, which the corps has basically applied, has not worked or has resulted, in effect, in further contamination of the mud dump site off of the coast of New Jersey, and then you also commented on the fact that you feel that the MPR is saying it needs to be significantly strengthened by clearly stating that the disposal of contaminated sediments is not allowed and that ocean disposal of contaminated sediments would be banned.

Part of the problem that I have at the Jersey shore is just this kind of rhetoric, in effect, that the environmentalists on the one hand are saying that what is going on is further contaminating the ocean and causing more and more pollution problems. And basically the corps, and I don't mean to be that negative about them because I work well with them, but the corps basically is taking the position that whatever they are doing in terms of ocean disposal is not really having a negative effect on the environment. What you point out is, well, the corps' effects approach basically says that we are not contaminating the environment or the ocean, yet we know from the scientific evidence that the site is deteriorating and that we do have more bans on fish species, et cetera.

So it is almost like this illusory notion that the dumping doesn't cause a problem, yet there is clear evidence that it or something involved with it is causing the problem.

When you say that the legislation should actually say that ocean disposal of contaminated sediments is illegal, in effect isn't that what the law already says, except that the criteria which are being used to determine what you can dump are the issue?

In other words, my feeling is that the issue always has been the sediment criteria. There isn't anything in the law right now that says you can actually dump contaminated sediments, is there?

Ms. CLARK. No, it doesn't say you may, but the language is, I think, just not pointed enough to say that absolutely no impact on the environment should occur with any disposal of dredged material.

It says should not significantly endanger the environment. It is structured so that the effects based testing that the corps and EPA have developed has somehow allowed sediments to pass that really shouldn't be passing because the mud dump site is in as degraded a state today as it is because some sediments pass that test and very few flunk, and I think if the MPR was stronger and more pointed about the contaminated sediments must not be disposed of in an open water situation, then the criteria would be much stronger.

Mr. PALLONE. I believe that is a very important point because if we can change the language to say that, then I think it would be much more difficult. For the corps to say that their test meets the language of the law, that is something that is new to me. I wasn't aware of that because I keep hearing from the corps that we don't—we are not creating a problem. So we will look at that as we are developing the legislation, but I think that is a significant point.

The other thing I wanted to ask is that I get the impression or at least again the rhetoric is that the real problem we have with con-

taminated sediments is the accumulation over a number of years of all this toxic material in industrial pollutants, non-point sources, whatever, and it is not so much that the process is continuing, but that we have this accumulated contamination over all these years.

Now, you are giving the impression today that maybe in fact the problem continues. In other words, that we are really not doing enough about source control or pretreatment and that that needs to be addressed legislatively as well because there is a further accumulation going on right now.

Could you just comment on that briefly. To what extent is the one a problem of accumulation over a hundred years versus what is happening right now? What could we do in that regard?

Ms. CLARK. I think both are true. There have been historic instances of great amounts of toxics disposed of in water such as the Hudson River, that are accidents or that occurred prior to strict environmental regulations, but nevertheless, toxics are still discharged into marine waters and the Great Lakes every day, either through direct discharge, through point sources, through point sources, and through air emissions, and those toxics are not being—you know, they have been controlled over the past 20 years, but it is not enough to the point where that sediments are not continuously building up.

People forget that sewage treatment plants themselves discharge toxic pollutants. The New York-New Jersey harbor is a perfect example of discharging amounts of heavy metals because they receive so many heavy metals from industrial sources. That ongoing, sort of chronic, daily load is contributing to the build-up of contaminated sediments throughout our harbors, and this is something that NOAA has verified and I think testified before several committees about.

Mr. PALLONE. Can I ask, because I think Ms. Milleman was kind of hinting at it, one of the major advantages of numeric criteria as opposed to this effects based approach is to deal with further pollution problems, in other words, further contamination and a way to try to effectively stop that.

Is that what you were saying when you were talking about the cut-off, that numerical criteria create a sort of cutoff?

Ms. MILLEMANN. I think it is a dual cut-off. Numeric criteria, when applied to sediments that are destined or that are suggested to be ocean-dumped, for example, would set a cut-off on just the concentration of pollutants in that sediment, and if the concentrations were above ten parts per million or whatever the cut-off was, then they automatically would not be able to be ocean-dumped because they would be too contaminated and they would exceed the requirements of the Ocean Dump Act.

The other cut-off would be the application of sediment criteria to sources of pollution, what you are referring to, which is to say that okay, we are hired under law to make sure that this sediment doesn't exceed ten parts per million, so we better go and look at all the sources of this pollutant, like Mercury, for example, or PCBs in the Great Lakes is a great example. And to see how we have to ratchet back on those inputs of that pollutant into this area so we can meet that number for what the sediment can tolerate before it

starts to be degraded to a point that fish and wildlife are affected by it.

Mr. PALLONE. Okay. Let me just ask another couple of things quickly. With regard to the status of the proposed numeric criteria, the CDI bill, and not to cast aspersions in any way, the CDI bill, although you mentioned, Ms. Milleman, that there includes a component requiring promulgation of sediment quality criteria doesn't really go far enough in terms of what you want.

Ms. MILLEMANN. No.

Mr. PALLONE. Would you just briefly explain why not?

Ms. MILLEMANN. Sure. The CDI, as you know, has a fairly small portion on sediment issues, and it is mostly just the promulgation of criteria for a list of pollutants, and there is a good amount of debate about whether or not that list itself is adequate representing all of the priority pollutants that should be addressed.

The sediment component of the coastal defense initiative is arguably its weakest section, and I think that is why this committee is presented with the fine opportunity to go in and augment and really push that section into something that is an extremely important legislative initiative.

For example, talking about the time period that states would need to be under to take those federal criteria, those federal guidelines, and translate them into standards.

The need, as Mr. Nowak pointed out, to have an inventory, at least a compilation of the information that already exists in these different federal agencies of the extent of sediment contamination. The need to start undertaking, as in your amendment would, in the New Jersey-New York Harbor area other remediation and decontamination-type applications to see what we can be doing with sediments.

There is great room for improvement on the coastal defense initiative in terms of the sediment portion itself.

Mr. PALLONE. What about what EPA is doing now? They are about to report back at some point soon. Have you gotten a date when they are going to give us this information and they are going to report back about proposed criteria?

Ms. MILLEMANN. They are working on criteria right now for a set of, what is it, seven metals right now. They have been getting advice from their science advisory board on the types of techniques they should be using to come up with those criteria, whether they should be doing this type or this type.

Mr. PALLONE. But again you are not proposing that we wait around for that in terms of what needs to be done? I mean, that is just one component. It doesn't really satisfy your concern.

Ms. MILLEMANN. That is true, it is just one component. It is not the whole picture, and secondly, we are encouraged by the fact that EPA has decided now at this point to take on the promulgation of criteria, but without congressional direction, without a congressional mandate, a congressional oversight that interest in criteria could wane and could be redirected to other issues.

That is why we think it is also very important to give them clear direction and a time line and also requirements as to what those criteria should be meeting to make sure that they don't look just at the water column, which is our concern right now with the way the

criteria are being developed. But they also look at what is happening in the sediment itself and to the critters that live on the sediment itself.

Mr. PALLONE. Okay. thank you very much. Thank you, Mr. Chairman.

Mr. NOWAK. Thank you. Mr. Geren?

Mr. GEREN. I just have one quick question. I assume you were here earlier when our colleagues were talking about the problem with the Miami River. Are we currently doing dredging anywhere for the purpose of removing polluted sediments or are we only doing dredging for the purpose of navigation?

One of the things that was proposed by the two members from Miami was to dredge out the polluted sediments in addition to just attacking the navigation problem. Is that a common practice?

Mr. HULSEY. Yes, Mr. Geren. One example is Waukegan Harbor where sort of a back water marshy area is being dredged as part of the Superfund agreement to augment the dredging of a small harbor in that area; the reason being is that the Waukegan Harbor has 500,000 parts per million PCB.

When you pick the stuff up in looks like oily dirt, and it is a major source for the rest of the lake, so that is why they are going into that area. We haven't really got—usually it is the case that no dredging proceeds because the area is too contaminated, as in the case of Indiana Harbor.

Mr. GEREN. That is what I was really wondering. What do you do if the corps were to undertake dredging for the purpose of removing polluted soil? It would seem that there would be a lot of problems associated with that. What would you do with just the huge volumes of polluted sediment we are talking about?

Is there an environmentally safe way to get rid of it?

Mr. HULSEY. Right now, thanks to the arts program, we are testing those programs. In the Indiana Harbor the Bureau of Mines is going to go in and remove the 25 percent of the material that is heavy metal using standard mining techniques for separating metals, and that will take out a great deal of the iron, the cadmium, and the lead that is trapped in those sediments.

We are looking at other techniques to remove the PCBs and organics. We should have some information within the next year or so how we are going to do it, and by having comprehensive sediment standards and criteria, hopefully the idea is that we will have the regulatory program in place, and we are already working to develop the technologies that these can come together, you know, in five years or so to have a really comprehensive national program.

Ms. MILLEMANN. The question you raise, too, is one that has recently grabbed the attention of EPA, and that is whey they are planning this conference next month Cincinnati, where they are going to bring together their techniques and scientists both at the Great Lakes National Program Office, but also at headquarters in the Superfund Program to literally sit down and exchange information.

It is not all the time that EPA communicates superbly between its regional and headquarter branches, so this is the first time that they are sitting down all of their technicians and experts and saying what success have you had with this technology, what are

its limitations, what is the volume you can apply it to, those kinds of information exchanges will take place which I think will help enormously.

Mr. PALLONE. Thank you very much.

I appreciate it.

Mr. NOWAK. Again, thank you for testimony, and we may get back to you as we are going to keep this record open. Thank you again.

[Ms. Millemann's prepared statement appears on page 197.]

[Mr. Hulsey's prepared statement appears on page 117.]

[Ms. Clark's prepared statement appears on page 90.]

Mr. NOWAK. Our last panel will be representing the port interests. The American Association of Port Authorities, Erik Stromberg, who is the President, the National Association of Dredging Contractors; Mark Sickles, who is the Executive Director, and the Port of New York and New Jersey, Frank Caggiano, is the Assistant Director of the Port Authority. He will be accompanied by David Berkovits, who is the Supervising Harbor Planner of the Port Department.

Gentlemen, welcome. We will let Erik begin the testimony. We will, as we have with others, of course, incorporate your total statements into the record.

TESTIMONIES OF ERIK STROMBERG, PRESIDENT AMERICAN ASSOCIATION OF PORT AUTHORITIES; MARK SICKLES, EXECUTIVE DIRECTOR, NATIONAL ASSOCIATION OF DREDGING CONTRACTORS; FRANK CAGGIANO, ASSISTANT DIRECTOR, PORT DEPARTMENT, PORT AUTHORITY OF NEW YORK/NEW JERSEY ACCOMPANIED BY DAVID BERKOVITS, SUPERVISING HARBOR PLANNING, PORT DEPARTMENT

Mr. STROMBERG. Thank you, Mr. Chairman.

It is a pleasure to be here. We certainly appreciate the opportunity to appear before this committee on such an important issue. I would like to briefly summarize my remarks and raise some of the high points that we feel are relevant in this, as I said, very important, very complicated issue.

As you are well aware, the American Association of Port Authorities represents virtually every major port agency in the United States. We are public entities. We develop facilities for the movement of water-borne commerce, and are also interested in economic development.

As public agencies, the protection of our environment is also a very serious and ongoing concern. I don't need to tell this committee the extent of the economic impact of our industry.

It has been widely documented, as well as the important role we play in national security interests. Because of the natural processes of siltation, ports need to dredge to operate, to maintain their operations and their activities. the extent of this dredging requirement varies from port to port, but it is here where we run into the issues that are pertinent to this hearing, and that is contaminated sediments.

We clearly recognize the problem, and we look at it, at the source as one of the most serious aspects of this problem. That is to

say that over time, over the past decades, pollutants have been entering our waterways both legally and illegally.

In fact, as has been stated in the previous panel, they are still doing so, and they are still being legally discharged into our waterways, so we must address this. We must develop very expensive solutions, even though we did not cause this problem, but we need to get on with it because we must continue, as I said, to dredge.

The extent of the problem in a real sense is based on the definition of contamination, contaminated sediments. It is an emotionally loaded term, and certainly the determination of contamination is a very complex, complicated issue. As we look at harbors across our country, we see different levels of pollutant and chemicals in the sediments, different levels according to region, different levels according even to the time of day as salinity changes over the tidal process.

Our view in general, sir, is that to determine the extent of the problem case-by-case logical assessments are required. Over the past years, the corps and the EPA have been working together to resolve this issue, and through extensive research and coordination, they have come up with testing protocols.

These protocols were last put in place in 1977 and there have been since then an effort to revise those and they are, as you are aware, coming together in the form of a draft guidance protocol which is known as the green book.

We are, in fact, analyzing this at the association level, but the fundamental approach that it takes, that is to say biological effects based is the approach that we feel is most appropriate in terms of the management of material and most appropriate in terms of the environment as well.

The tests may be more expensive, but our views are that they are consistent and scientifically valid. Moreover, through the deliberations at the London dump convention, this approach has been endorsed. EPA has control over the program, as it should. The corps, which has strong expertise, is integrally involved as it should continue to be.

Mr. STROMBERG. Some have, both through legislation as well as at the previous table, proposed the imposition of numerical standards, and I would like to briefly comment on numerical standards as an approach.

The consistent and uniform standards that were mentioned as having value by the last panel in our way of thinking simply don't work. We agree with the severity of the problem, but we do not think that these kinds of standards are the approach to be used. They are arbitrary. They perhaps result in poorer environmental decisions.

For an example, if you are looking at a level of concentration, the assumption is that one unit below that level is perfectly all right environmentally. I think that is an arbitrary determination. They are difficult to apply nationally.

They offer, for example, different background levels that occur naturally, and in some cases these background levels have exceeded the standards that have been proposed. They do not account for, in our view, the interactive nature of sediments and potential con-

taminants, which in fact my result in more rigorous requirements under an effects-based regime than in a numerical regime.

There is, we acknowledge, in certain areas potential applicability of numerical standards and we certainly encourage further research in this area, but we oppose numerical standards as a decision-making tool at this point in time.

We feel that the EPA and the corps are moving ahead with their protocol. These protocols, as indicated in the new "Green Book", have not had a chance to work, and they should be given that chance to work.

We certainly look forward to working with this committee in the number of ways that we can research that would help the program work even better, which include long-term management strategies, which include more resources for site monitoring and site designation.

We also encourage an inventory to be taken. We feel that there is simply not an adequate understanding of the extent of the problem, especially outside navigation channels.

I would conclude my oral remarks with that, and certainly be pleased to respond to any questions that you may have.

Mr. NOWAK. Thank you very much.

Mark, do you wish to put in a statement as well?

Mr. SICKLES. Would I like to make my statement at this time? Is that the question?

Mr. NOWAK. Do you have a statement for the record, too?

Mr. SICKLES. No.

Mr. NOWAK. Okay. Please proceed.

Mr. SICKLES. Good afternoon. I am Mark Sickles, the executive director of the National Association of Dredging Contractors, a trade association whose members are engaged in underwater excavation activity, primarily building and maintaining America's navigation system. Thank you for the opportunity to testify today on the important topic of contaminated sediments. My testimony will be brief and to the point.

Although the proportion of highly contaminated underwater sediments found in the nation's commercial navigation channels is relatively low and can be handled safely with prudent management, there are a number of documented sites outside of the channels that are in dire need of remedial action.

In some places, the stabilization of these sites may eventually reduce the levels of contaminants that ultimately are found in the navigation channel. With fewer underwater sources of contamination, routine dredging necessary for the movement of domestic and international commerce is likely to be less controversial.

For all of us concerned about the maintenance of our critical navigation system, cleaning up hot spots should be a top priority. Not only would the immediate environment be improved, but the public will eventually be less inclined to view all underwater soil as toxic sludge.

There are five points I would like to quickly make regarding the development of a workable program.

First, we recommend the program focus all of its energy on resolving the environmental problem as cost effectively as possible with only secondary focus on finding the responsible polluter.

Often, the Superfund program becomes bogged down in allocating and assessing responsibility, rather than solving the problem at hand. Any new program should be structured as much as possible to avoid drawn-out legal battles.

As you know, it is often hard enough to find a responsible party on land in Superfund, and it will be much harder underwater where transportation has taken place over long distances.

Secondly, the program should incorporate enough flexibility to employ proven isolation techniques within the aquatic environment. The record demonstrates that subaqueous capping has been effective over time and that caps have remained in place, even though violent storm events.

Other more exotic remediation alternatives may have some potential in the future and may totally destruct these pollutants, and that is a way to proceed rather than isolation, which I mentioned that capping provides, but the cost of these techniques so far, and maybe they will come down with government and industry programs that we can work together on, but right now these methods are so expensive that we could never proceed with any of the number of sites that we already know need to be cleaned up, if we employ those, there is just not that much money.

Third, the Corps of Engineers is the right agency to direct this program in close consultation and coordination with EPA. We have invested over $100 million in taxpayer dollars over the years, and the corps, as you know, is the primary contractor for the EPA Superfund program, and has acquired great expertise in contaminated soils management of all types.

You mentioned already today about piggy-backing on the navigational maintenance program, and we think this may or may not be a cost effective or workable solution, especially if it is mandatory. Although we support giving the corps a new authority to do this, we are afraid that it could jeopardize moving forward with our regular maintenance when the almost inevitable disputes arise over where to put the contaminated materials once you have them dredged, and experience dictates that even where we have 90 percent of the people agreeing on what to do with the material, that the other 10 percent or the 1 percent can stop the preferred solution.

Fourth, this program should not be financed by revenues generated by the Harbor Maintenance Trust Fund as proposed in S. 2594. Although we realize that a dedicated source of funds is probably needed to make the program work, and even if you assume the tax increase superimposed by the President is enacted, the trust fund, that the tax break that the President proposed was generated by what it cost today at today's price to dredge 100 percent of the commercial navigation costs. And so therefore, that money would be totally called for, I mean taken up if that tax proposal is enacted as proposed. And furthermore, as a matter of equity, the importers and exporters that are paying the tax are rarely the folks that are most associated with the source of pollution.

Fifth, and most importantly, and I guess the biggest reason we wanted to testify at this hearing today, is that we would like to respond to doubts that have been raised about the U.S. dredging in-

dustry's capability to utilize advanced technologies in response to the contaminated sediment problem.

The National Academy's report that we heard about yesterday states that: "Because of legal, i.e., Jones Act, and practical restrictions that limit access to foreign-built vessels domestically, it may be difficult to secure access to this technology in the United States except as equipment fitted on to U.S.-built vessels or supplied through U.S. subsidiaries of foreign dredging companies."

The technologies in question here are specially designed hydraulic cutterheads or mechanical clamshell devices, which are designed to reduce the turbidity when dredging. The simple reason that superior foreign technology exists is that there is a demand in other countries for these services.

These are not technologies we cannot purchase or preferably develop right here in America, and maybe in concert with the Federal Government, but probably we could do it on our own, if given the opportunity to secure a reasonable investment, and that constitutes, that would require development of a program, a comprehensive program to do this. The Jones Act simply ensures that we build the hulls and superstructures of our vessels in U.S. shipyards, a further testament of our maritime policy.

In summation, NADC members want to participate with the government in developing whatever solutions are warranted.

Thank you for your attention, and I would be happy to answer any questions.

Mr. NOWAK. Thank you very much.

We will go to the Port Authority of New York and New Jersey represented by Frank Caggiano.

Mr. CAGGIANO. Thank you, Mr. Chairman. Thank you for the chance to testify today.

I am Frank Caggiano, Assistant Director of the Port Department of the Port Authority of New York and New Jersey. Seated on my right is David Berkovits, Supervisor of Harbor Planning of that same agency.

The port authority is a bistate public and fiscally independent agency with responsibility over a wide range of transportation and commercial facilities and programs in the New York/New Jersey metropolitan region.

Contaminated sediments is the subject of some well-intentioned and worthwhile legislation that nevertheless can serve to exacerbate the challenges facing our port and others.

The term contaminated is itself a source of some confusion when different parties discuss or testify on the subject. Whatever we choose to call it, or however we choose to characterize sediments, the need to carry out dredging and disposal activities remains a given in most ports in the United States today, as is the need to guard our natural resources and save environment.

While my comments are not identified with specific legislation, I would first like to address a provision of legislation that I believe will be before your subcommittee shortly. The Merchant Marine and Fisheries Committee reported H.R. 2647, the Coastal Defense Initiatives Act, with a section that singles out the New York/New Jersey Port by denying access to the Section 103(d) waiver provision of the Ocean Dumping Act.

I urge that this committee strike section 210(d)—and in my written testimony I must note the "(d)" was mistakenly omitted—from the legislation because it is discriminatory. This section eliminates a rational process for a time of potential crisis. For the elimination of the section 102(d) waiver provision could result in the halting of dredging of channels serving one of the most important ports in this country.

Simply stated, the existing waiver provision allows the Corps of Engineers, when faced with dredged material that in some way falls short of the statutory criteria for ocean disposal, to seek EPA approval of a waiver to permit the disposal of this material.

EPA is presented with the facts on the quality of the material, the proposed method of disposal, and the consequences should dredging not be allowed. EPA is not obligated to grant the waiver if the administrator finds that the material would cause an acceptable adverse impact.

Mr. Chairman, the waiver provision of the law has never been used. We hope it will never be needed.

What concerns the port authority is that in the adoption of section 210(d), the port of New York and New Jersey is being singled out to not have the protection of the law that is available to other ports, which in fact we are in competition with. Clearly, this is discriminatory.

In reviewing the various legislative proposals of the House and Senate, we have identified issues and concerns that are the basis for my testimony today. As this committee examines the sediments question, I hope that these comments might serve in some part as a rationale for your decision making.

Number one, we disagree with the requirement of several bills that numerical criteria and standards for sediment be developed. To do so would be to establish ambient sediment quality standards, such as in the Clean Air Act. We can think of no sound scientific or policy basis for such action.

To establish ambient quality standards presumes a basic uniformity in the coastal and ocean sediments, which really does not exist. Just as we have soils of differing characteristics, sediments vary from region to region and within regions. Some parts of the harbor bottom are sand, others silt, still others are naturally higher in organics. Some are in salt waters, others brackish, others fresh water.

On analysis, most sediments have natural concentrations of a variety of metals, with concentrations varying even within one area. How can a numerical standard be set to judge the contamination of sediments from the Chesapeake Bay or Lake Erie when the base lines, as provided in nature, may be very different?

Present law is not without a standard for sediments. The difference is that section 102 of the Marine Research, Protection and Sanctuary Act is an effects-based standard, not an ambient quality standard.

Number two, legislation, while it has an environmental focus, should nonetheless recognize the essential nature of dredging activities in the improvement and maintenance of the nation's waterways. It should recognize that the disposal of dredged material in

the water or on land is an activity to be managed, not made difficult.

Much as fisheries and recreation are viewed as strong economic reasons to protect the natural resource, the port sector is also a major economic consideration that does not by definition conflict with that goal.

Three, in looking to have EPA develop criteria and standards for sediments, Congress should require the active involvement of the Corps of Engineers. Notwithstanding EPA's mission and level of expertise in environmental issues, it can be said that the greatest expertise in government on the subject and management of sediments is the Corps. It is an expertise that is essential to the process and should be explicitly involved in the development of criteria and standards, if criteria and standards are required.

Four, proponents of legislation generally have linked marine water quality and sediment quality as if the two are the same. They are not. Several bills propose numerical criteria and standards to be applied to marine waters and sediments. Tying the two may be convenient, but it ignores the fact that chemicals and compounds behave differently in water than in sediment.

Contaminants available to marine life in the water column may be unavailable to marine life when found in sediments. This is a major distinction. Congress should be guided by science, not convenience.

Number five, by the same token, Congress should allow EPA the latitude to develop the most appropriate criteria and standards, whether numerical or biological, for the particular constituent and situation. Over the years, those kinds of decisions have been made in developing criteria. Tests have evolved and been refined. Bench marks are able to be decided in the deliberate way of science.

Much of that has gone into the joint EPA-Corps dredged material testing guidance document, what is effectively known as the "Green Book", that is now out for review and comment. This composite guidance, which is ecologically effects-based, has merit and credibility in the scientific community and within Federal agencies.

Number six, as states are encouraged to develop their own criteria and standards, legislation should not give states jurisdiction over ocean dumping that is clearly outside state waters. Beyond clear state boundaries, who can say which states' standards should apply to a particular site?

Current law makes more sense and avoids confusion and ambiguity. Let the Federal law rule. Only then can tension and conflicts among the states can be avoided on issues which will directly affect interstate and international commerce.

Number seven, if Congress were to further restrict ocean and coastal water disposal of some sediments, it should be very careful not to preclude those water-based dredge material management solutions that have been found effective in the management of questionable or contaminated sediments. These are environmentally sound ways to manage the vast majority of dredge material without resorting to upland and very expensive containment solutions.

Number eight, Congress should be mindful of the enormous volume of material associated with dredging when they consider legislation, that by major adjustments in standard, will require

containment solutions. In the Port of New York and New Jersey, anywhere from 6 to 10 million cubic yards of silt, rock, sand and mud are dredged annually. Only 3 to 5 percent of it is found to be contaminated using existing standards.

If we understand the underlying mood and intent of Congress, under future standards we would expect that number to rise. The future containment, or, as some have suggested, the possible treatment of a larger portion could be physically and logistically unmanageable over the years. There are proven ways to manage water materials having some contamination without resorting to disposal methods that would prove impractical.

Lastly, Congress should maintain a full view perspective when considering sediment issues. Not surprisingly, various bills are concerned with various issues. None of them cover all aspects, including containment disposal.

Will sediment restoration activities violate marine water and sediment standards? Where should contaminated sediments be placed? If they can't go in the water, where then? And the consequences of managed ocean solutions weighed against the consequences of upland solutions?

In the development and execution of various plans for sediment restoration, Congress should be aware that carefully managed dredging and disposal activities are the principal means to achieving improved sediment quality.

Mr. Chairman, I hope these observations and suggestions are of help to you and the subcommittee. Contaminated sediments is a vexing problem. As Congress looks to what might be done to stem this problem, we wish to encourage you, but ask that it be done with sensitivity to the maritime activity of the ports.

Thank you, Mr. Chairman.

Mr. NOWAK. I can't agree with you more; the contaminated sediment is a vexing problem. Thank you for your testimony.

Let me turn to David before I ask some general questions of the panel.

David, you are from the port department. Do you have a formal statement, or are you willing to pass for the questions at this time?

Mr. BERKOVITS. Thank you very much.

Mr. NOWAK. We, in your testimony, along with the testimony of the previous panel, really to some degree are hearing about conflicts in some very essential areas, and yet, on the other hand, I think to some degree we are both trying to, you are both trying to arrive at something that does make sense.

Let me ask you this question, for our own information. How are you doing the effects-based testing now of the soil? Do you have that information?

Mr. BERKOVITS. Do you want me to answer?

Mr. NOWAK. Just describe what testing is done, and then how do you identify within the Port area physically the bottom-typed sediment?

Mr. BERKOVITS. Well, especially we use a guidance manual that is regionally based. In the Port of New York and New Jersey, we use the "Green Book," and we are pretty much up to date.

We are presently using most of the changes that are incorporated in the draft, final draft revised "Green Book" that is out on the

street for comments. What we do is we extensively sample the material. We perform both sediment analysis, which includes chemistry and generates numbers of various contaminants in it.

Mr. NOWAK. Do you run the sediment through a spectrometer? Do you use that?

Mr. BERKOVITS. We do extractions of the sediment and we do chemical tests; which particular test and method, it varies depending on the constituent. So the actual chemistry, the chemical test will vary, mass spectrographometers, gas spectrometers are used for organics and very sophisticated equipment is used.

Mr. NOWAK. For various——

Mr. BERKOVITS. Depending on the constituent. The matrix of the dredge material is very difficult, because of the salt concentrations that are in estuarian systems, so that the soil adds to the difficulty of the chemistry.

Mr. NOWAK. Let me ask you this. When you perform these tests in one given port area, and you then dredge in another port area, do you have pretty well in your minds a delineation between different bottom sediments and what you are receiving?

Mr. BERKOVITS. Well——

Mr. NOWAK. Or do the constituents change drastically from zone to zone?

Mr. BERKOVITS. The constituents change for various reasons within the port.

Mr. NOWAK. I mean if you have a dump, certainly that is going to affect it, but the regular flushing——

Mr. BERKOVITS. Let me backtrack a little, Mr. Chairman. The amount of material that we dredge in the Port of New York and New Jersey is approximately 6 to 10 million cubic yards of material.

The natural sedimentation process far exceeds that, so the actual material that goes to the ocean via the mud dump is maybe 10 percent of the actual sediment that actually enters the ocean through natural processes.

Mr. NOWAK. That has flowed out during the year?

Mr. BERKOVITS. That is correct.

Mr. NOWAK. So you are helping Mother Nature by about 10 percent?

Mr. BERKOVITS. In the course of——

Mr. NOWAK. Or Mother Nature is doing 90 percent of the dredging?

Mr. BERKOVITS. That is correct.

Mr. NOWAK. Without any testing.

Mr. BERKOVITS. That is correct. That point is rarely mentioned. The normal estuarian system would end up in shallow waters in the Port of New York. We would have a shallow water.

We would silt up to about 19 feet deep. Our target vessels require 35, 40 foot draft channels, so therefore, that is why we dredge.

Mr. CAGGIANO. The corps provides a cross section of locations that would require sampling, and the first step in the process, I think to get back to your original question, the first stage in the process is that we are presented with what is known as an acceptable cross section of locations that sampling will be done, which we

will turn over to an independent scientific lab whose results are then turned over to the Corps of Engineers and EPA.

Mr. NOWAK. Okay. And then his findings would be documented back to you, and would be recorded so that whatever was taken out, you would have the exact consistency, whether it is mass spectrometry, gas spectrometry, you would have those amounts noted, and what parts per million or billion were recorded; is that correct?

Mr. BERKOVITS. That is correct.

Mr. CAGGIANO. And the method used for disposal and then you would also have a trace of where, who delivered it to where.

Mr. BERKOVITS. That is correct.

Mr. NOWAK. So you would have a so-called cradle-to-grave kind of deposition?

Mr. BERKOVITS. There is a chain of custody record for the sampling, the testing, that is performed.

Mr. NOWAK. And following, as far as the "Green Book" has gone up to this point in time?

Mr. BERKOVITS. Yes, sir.

Mr. NOWAK. I don't know if you are the right group to even answer this question, but we were talking about, you know, mixing some sediment criteria to be used in conjunction with the so-called effects-based testing.

Could that be devised that you believe could be more effective in the detection and the moving of dredge material?

Mr. BERKOVITS. Well, the criteria is ever evolving. What has happened over the years, criteria has changed as science becomes more knowledgeable, and it is an evolutionary process and it is not as slow as people would make out, because science is moving by leaps and bounds.

The ability to detect contaminants at lower and lower levels far exceeds the ability to remediate those contaminant levels. The requirements and regulations have proceeded along the lines of science and the ability to detect the contaminants, so that our test protocols become more severe and stringent.

We also look at test organisms that are representative of the organisms of the ecosystem and we test them for chronic and acute impacts. We look at sub-lethal effects, we look at mortality rates and we look at bioaccumulation, tissue concentrations of various constituents that are considered important.

Ms. SICKLES. If I could take a shot at that question, Mr. Nowak, in the new tired testing green book approach, in tier two is the bulk chemistry test, bulk sediment analysis. In every part of the country there are numbers associated with levels of contaminations of chemicals of concern that if they come up higher or they are significant according to these numbers, that would trigger the next step which would be the extensive bioassays that cost $5,000 to $6,000 a sample to do sometimes, to do these bioassays.

The new green book has much longer bioassays than have been used to date, and they are using more sensitive organisms in bioassay tests with the organisms that will take up and absorb into their tissue the contaminant much more readily. They selected these after years of research on different types of test organisms, and the American Society of Testing Materials has approved of this type of testing.

It is similar to what FDA would use and other types of health organizations. So numbers are used, can be used beneficially. Take, for instance, in Puget Sound where they have probably the most in-depth state program for managing sediments, they have numbers that were developed using one of the systems that the Science Advisory Board is looking at, and they developed numbers that if your contaminant is tested for these particular materials and it is below that level, no more testing has to be done and you can use aquatic disposal.

If it is above that level, then that triggers it into the bioassay approach. It is very similar to the green book testing. Of course, that is all four four waters. Those aren't ocean waters in Puget Sound. It is a system that is working well.

A lot of sediment has passed the numerical standard—well, the cut-off level. There are many technical problems with using numerical standards that you probably don't want to hear me talk about here at length.

Mr. NOWAK. One of the questions that we are going to be looking into, of course, is trying to find some additional revenue, and that has been identified in at least one proposal over in the Senate as the Harbor Maintenance Trust Fund, and that proposal, I guess, the administration goes from .04 percent to .125 percent; is that correct?

Mr. CAGGIANO. That's correct.

Mr. NOWAK. What does that generate in terms of actual dollars or what has—I guess we can multiply by three and come out to a fairly, you know, approximate number. Do you have that?

Mr. STROMBERG. I believe the last year it has been about $160 million. It is to recover at this point up to 40 percent of the navigation O&M related costs. The tripling of it would raise some $460 to $480 million. There is in addition some percentage, 1 percent, I believe, that is going to NOAA for their satellite navigation purposes.

Mr. NOWAK. In your testimony, too, you have alluded to the fact that you feel that that should stay in the navigation, "dredging area," and not be used for any environmental work that may be necessitated by any further Corps expansion; is that correct?

Mr. STROMBERG. Our concern there in leaving the equity matter aside is to whether or not the shippers, the cargo interests should be paying for this. While the initial amount specified in Mr. Moynihan's bill is relatively small, that our sense of the future outlays required from the trust fund could be quite significant and preclude navigation dredging.

Mr. CAGGIANO. I also would point out that while we want many of the points and the good features of the Moynihan bill, as it relates to the New York and New Jersey region, we are concerned about the additional cost it would place on shipments through our port and could result in Canadian diversion.

Right now, the Port of Montreal handles approximately 5 million tons of cargo per year. Twenty-five percent of that cargo is presently destined to the New York region, and we are concerned that by raising of the cost we will divert more cargo to the port of Montreal.

Secondly, we have worked very hard as a port agency to stimulate the flow of exports through our port, especially value exports, and in 1989 our region was able to increase the flow of exports by 30 percent.

Now, this additional cost would raise the cost of exports on the world market and could result in an area of noncompetition. For high value cargo, the increase in costs of this .25 could amount to as much as $600 a container.

Mr. NOWAK. You mentioned the competitive economic advantage if you are going up to—you are talking about the port at Montreal in terms of cost, is there any advantage at the present time to go into Montreal, any other tax or any other added cost that they have.

Mr. CAGGIANO. No. All of their dredging is free to the port.

Mr. NOWAK. But they do dredging or somebody does dredging?

Mr. CAGGIANO. They do.

Mr. NOWAK. The Federal Government pays it?

Mr. CAGGIANO. They pay the cost.

Mr. NOWAK. As you put on more and more user taxes you are going to find some added pass-throughs if they can take them. Of course, if those goods are going to be sold here, they may have additional other costs to bring those products back if they took them up to Montreal, too, though, so you got somewhat an offset in terms of transportation, total transportation costs.

Mr. STROMBERG. Mr. Chairman, my understanding is that the Port of Montreal uses the number—50 percent of their cargo is U.S. borders.

Mr. NOWAK. Comes back. And that 50 percent could be dropped off through Baltimore, through New York, through Norfolk.

Mr. STROMBERG. Sure. It is discretionary cargo.

Mr. NOWAK. All of the East Coast ports.

Mr. STROMBERG. I say that in recognition of my current Chairman because we recognize Canadian is in fact from the Port of Montreal.

Ms. SICKLES. On the Canadian West Coast, most of the cargo that comes from British Colombia comes through Puget Sound. Our ports have a higher productivity and the economic advantage of coming in there, so it is not all cargo coming into the U.S. through Canada. Some of it comes through ours to their country.

Mr. NOWAK. On the other hand, you do support if the corps' mission expands and if there is payment either from a general fund or the corps maintenance operation, maintenance fund that they could look at expanded—outside of the navigation channel in these areas?

Mr. CAGGIANO. Yes, we do support that.

Mr. NOWAK. We will be looking—Congressman Pallone had another meeting he had to run off to, but your points that you raised here relating to the waiver, I think, I want to give him an opportunity to review and comment on that, then we will be able to get back to you.

There are, I think, a lot of positions that will have to be brought together as we move forward in this whole contaminated sediment area. Again, one of the basic problems is we have got to devote more time, more money, more research to better define these areas

that there is some disagreement about, and in order to finally get the kinds of dollars that are going to be necessary, we first have to move just to a basic inventory.

Do you have or do the ports have ideas as to where contamination is? Have they tested to high degrees, levels, even though it is outside their channel? Is there anything that exists like that?

Mr. STROMBERG. No, not to the extent that is required, and perhaps Mr. Berkovits could address it with more particularity with regard to New York.

It is our understanding based on the Corps of Engineers that the level of contamination within the channel, because of the active process of moving the material through tends to show less signs of the highly contaminated Superfund type sediments than might exist elsewhere, but I will leave it to our technician.

I would certainly be happy to get back to you with whatever we have available on that issue.

Mr. NOWAK. Fine. I appreciate it.

Mr. Berkovits?

Mr. BERKOVITS. Well, in the New York and New Jersey region there are a number of programs that have been done for monitoring. NOAA has monitored sediments, the Corps of Engineers, EPA, also the state agencies. In New York State DEC and the New Jersey DEP, even New York City——

Mr. NOWAK. So it shouldn't take us a large amount of time to pull this information together?

Mr. BERKOVITS. No. There is a tremendous amount of data sets. They have not been coordinated as of yet There is the national estuaries program, which the port participates in and we are a member of the committee, and part of that program and the New York bike restoration program is to pool the information together so there is a collective knowledge of what exists and what gaps remain to be tested for, so there are a number of programs that are being pulled together to identify information that is missing and information that is available and to make it available to the agencies that require it.

Mr. NOWAK. Who is pulling that together?

Mr. BERKOVITS. It is predominantly headed by U.S. EPA., The Corps of Engineers is part of the process, and New York State DEC and New Jersey DEP are the agencies involved. There are also the Interstate Sanitation Commission is part of the management committee. There are many scientists, environmental groups, and commercial interest groups.

Mr. NOWAK. Well, okay. Thank you very much.

We will again be keeping this record open, and after we have another opportunity to go through. One of the committee counsel has been ill and I want to give him a chance to review all your testimony, and then we will be back to you hopefully within a few weeks to fill in any gaps we have.

I want to thank you for your testimony and look forward to working with you in the future. The subcommittee will stand adjourned.

[Whereupon, at 4:10 p.m., the subcommittee was adjourned, subject to the call of the Chair.]

[Mr. Stromberg's prepared statement appears on page 221.]

[Mr. Sickle's prepared statement appears on page 217.]
[Mr. Caggiano's prepared statement appears on page 86.]

Prepared Statements of Witnesses

Testimony of Frank N. Caggiano
Port Department
The Port Authority of New York & New Jersey

before the Water Resources Subcommittee
House Public Works and Transportation Committee

on the subject of Sediment Quality & Criteria

May 16, 1990

Mr. Chairman, thank you for the chance to testify today. I am Frank Caggiano, Assistant Director of the Port Department of the Port Authority of New York & New Jersey. The Port Authority is a bistate public and fiscally independent agency with responsibility over a range of transportation and commercial facilities and programs in the New York/New Jersey metropolitan region. Our marine terminals are at several locations in both states including container terminals in Newark and Elizabeth, New Jersey and in Brooklyn and Staten Island, New York. We also have a newly opened Auto Marine Terminal in Jersey City and Bayonne, New Jersey.

Contaminated sediments is the subject of some well intentioned, and in some ways worthwhile, legislation that nevertheless can serve to exacerbate the challenges facing our Port and others. The term "contaminated" is itself a source of some confusion when different parties discuss or testify on the subject. It is in some ways an exercise in semantics and it is a clue to how the issue defies the use of simple categories in crafting policy. Whatever we choose to call it, or however we choose to characterize sediments, the need to carry out dredging and disposal activities remains a given in most ports in the United States today as is the need to guard our natural resources. While most of my comments are not identified with specific legislation I would first like to address a provision of legislation that I believe will be before your subcommittee shortly.

The Waiver Provision

The Merchant Marine & Fisheries Committee reported HR 2647, the Coastal Defense Initiatives Act, with a section that singles out the New York/New Jersey Port by denying access to the section 103 (d) waiver provision of the Ocean Dumping Act. I urge that this committee strike section 210 from the legislation because it is discriminatory. This section eliminates a rational process for a time of crisis. The elimination of the section 103 (d) waiver provision could result in the halting of dredging of channels serving one of the most important ports in this country.

Simply stated, the existing waiver provision allows the Corps of Engineers, when faced with dredged material that in some way fails the statutory criteria for ocean disposal, to seek EPA approval of a waiver to permit the disposal of the material. EPA is presented with the facts on the quality of the material, the proposed method of disposal,

and the consequences should dredging not be allowed. EPA is not obliged to grant the waiver if the Administrator finds that the material would cause an unacceptably adverse impact.

Mr. Chairman, the waiver provision of the law has never been used. We hope it will never be needed. What concerns the Port Authority is that in the adoption of section 210, the Port of New York/New Jersey is being singled out to not have that protection of the law and to not have the same recourse under the law that is available to other regions. Clearly, it is discriminatory.

(d)

Sediment Issues

In reviewing various legislative proposals of the House and Senate we have identified issues and concerns that are the basis for my testimony today. As this committee examines the sediments question, I hope that these comments might serve in some part as a rationale for your decisions. The following are in no particular order of importance.

1. We reject the mandate of several bills that numerical criteria and standards for sediments be developed. To do so would be to establish ambient sediment quality standards such as in the Clean Air Act. We can think of no sound scientific or policy basis for such action. To establish ambient quality standards presumes a basic uniformity in the coastal and ocean sediments, which really does not exist. Just as we have soils of differing characteristics, sediments vary from region to region and within regions. Some parts of the harbor bottom are sand, others silt, still others are naturally higher in organics. Some are in salt waters, others brackish, others fresh water. On analysis, most sediments have natural concentrations of a variety of metals, with concentrations varying from one area to another.

How can a numerical standard be set to judge the contamination of sediments from the Chesapeake Bay or Lake Erie when the baselines, as provided in nature, may be very different? Present law is not without a standard for sediments. The difference is that Section 102 of the Marine Research, Protection and Santuaries Act (MRPSA) is an effects-based standard, not an ambient quality standard. If legislation mandating the development of ambient quality standards for marine sediments is enacted, will Congress next do the same for soils? More importantly, is there a sound basis for doing either?

2. Legislation, while it has an environmental focus, should nonetheless recognize the essential nature of dredging activities in the improvement and maintenance of the nation's waterways. It should recognize that the disposal of dredged material in the water or on land is an activity to be managed, not made difficult. Much as fisheries and recreation are viewed as strong economic reasons to protect the natural resource, the port sector is also a major economic consideration that does not by definition conflict with that goal.

3. In looking to have EPA develop criteria and standards for sediments Congress should require the active involvement of the Corps of

Engineers. Notwithstanding EPA's mission and level of expertise in environmental issues, it can be said that the greatest expertise in the government on the subject and management of sediments is in the Corps. It is an expertise that is essential to the process and should be explicitly involved in the development of criteria and standards, if criteria and standards are required. We have identified a prejudice in some who suggest that either the Corps does not have the scientific expertise or that, because they carry out the navigation projects, they should not be given responsibility in setting criteria and standards.

Similarly, some would give EPA permitting responsibility under section 103 of the Ocean Dumping Act for dredged material. It is not warranted. The Corps of Engineers has spent over $100 million in research and development to support the navigation and regulatory program. The Corps spends over $1 million each year on research specifically relating to the management of highly contaminated sediments. In addition, the Corps is the construction manager for the EPA under Superfund. Therefore, the Corps should be partners with the EPA in the development of criteria and standards for sediments, if so required.

4. **Proponents of legislation generally have linked marine water quality and sediment quality as if the two are the same.** They are not. Several bills propose numerical criteria and standards to be applied to marine waters and sediments. Tying the two may be convenient but it ignores the fact that chemicals and compounds behave differently in water than in sediments. Contaminants available to marine life in the water column may be unavailable to marine life when found in sediments. This is a major distinction. Congress should be guided by science, not convenience.

5. **By the same token, Congress should allow EPA the latitude to develop the most appropriate criteria and standards, whether numerical or biological, for the particular constituent and situation.** Over the years, those kinds of decisions have been made in developing criteria. Tests have evolved and been refined, benchmarks are able to be decided, in the deliberate way of science. Much of that has gone into the joint EPA/Corps dredged material testing guidance document (the "green book") that now is out for review and comment. This composite guidance which is ecologically effects-based has merit and credibility in the scientific community and within federal agencies. It should be noted that the London Dumping Convention and the Marine Board of the National Research Council supports effects-based testing using a broad array of tests for the effective management and regulation of dredged material disposal activities. Also, Congress should not interfere with a process that cannot be rushed. EPA should not be required to meet patently unrealistic deadlines.

6. **As states are encouraged to develop their own criteria and standards, legislation should not give states jurisdiction over ocean dumping that is clearly outside state waters.** Beyond clear state boundaries, who can say which state's standards should apply to a particular site? Current law makes more sense and avoids confusion and ambiguity. Let the federal law rule.

7. **If Congress were to further restrict ocean and coastal water disposal of some sediments, it should be very careful not to preclude those water-based dredged material management solutions that have been found effective in the management of questionable or contaminated sediments.** There are environmentally sound ways to manage the vast majority of dredged material without resorting to upland and very expensive containment solutions.

8. **Congress should be mindful of the enormous volume of material associated with dredging when they consider legislation, that by major adjustments in standards, will require containment solutions.** In the Port of New York and New Jersey, anywhere from 6 to 10 million cubic yards of silt, rock, sand, and mud are dredged annually. Only 3 to 5 percent of it is found to be contaminated using existing standards. If we understand the underlying mood and intent of Congress, under future standards we would expect that number to rise. The future containment or, as some have suggested, the possible treatment, of a larger portion could be fiscally and logistically unmanageable over the years. There are proven ways to manage materials having some contamination without resorting to disposal methods that would prove impractical.

9. **Congress should be mindful of the regulatory hurdles that may be created and the economics of greatly increased regulation of dredged material that could result from legislation.** The permitting process must be predictable as must be the disposal strategies. Costs, already increasing as a result of the necessary testing requirements, could skyrocket and undermine the never-ending attempts of ports to remain competitive.

10. **Congress should maintain a full-view perspective when considering sediment issues.** Various bills are concerned with preventing sources of sediment contamination, setting criteria and standards for sediment quality, setting standards that would govern dredging activities, requiring the restoration of sediments, and providing for the improvement and maintenance of channels and other navigational infrastructure. These can be in conflict. For example, will sediment restoration activity itself violate marine water and sediment standards? Where should contaminated sediments be placed? If they can't go in the water, where then? Are the consequences of managed ocean solutions weighed against the consequences of upland solutions? (Pollutants that are stable in sediments can cause harm when taken out of the water. As an example, sediments containing heavy metals when placed upland may be oxidized and exposed to acid rain which can increase the mobility of the metals through leaching.) In development and execution of various plans for sediment restoration, Congress should be aware that carefully managed dredging and disposal activities are the principal means to achieving improved sediment quality.

Mr. Chairman, I hope these observations and suggestions are of help to the subcommittee. Contaminated sediments is a vexing problem. As Congress looks to what might be done to stem the problem, which we greatly encourage, we ask that it be done with sensitivity to maritime activity and the ports.

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TESTIMONY OF
THE
ENVIRONMENTAL DEFENSE FUND

BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES
OF THE
COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION
HOUSE OF REPRESENTATIVES

ON ISSUES CONCERNING SEDIMENT QUALITY CRITERIA

PRESENTED BY:
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MAY 16, 1990

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Testimony of
Environmental Defense Fund
before the
Subcommittee on Water Resources
of the
Committee on Public Works and Transportation
House of Representatives

Sarah L. Clark, Staff Scientist
May 16, 1990

CONTAMINATED SEDIMENTS ARE A NATIONAL PROBLEM THAT NEED A NATIONAL SOLUTION

The evidence is rolling in that contaminated sediments are an all too common phenomenon in our nation's waterways. The U.S. Environmental Protection Agency (EPA) determined in 1987 that almost every harbor and different type of waterbody in the United States has contaminated sediments.[1] The National Oceanic and Atmospheric Administration (NOAA) has found toxic sediment, fish and shellfish contamination to be of national proportions.[2] Four years ago, NOAA initiated the National Status & Trends (NS&T) program and began collecting field data at over 200 sites.[3,4,5] The sampling program provides data on contaminants in sediments, mussels and oysters around the country's marine coasts (the program measured organic wastes, heavy metals and pesticide residues.) The sites with highest levels of contamination are those located in closest proximity to cities and ports, particularly near Boston, New York, San Diego, or Seattle.[4] The NS&T program also found that levels of metals, such as mercury, selenium and lead appear to be increasing nationally in the coastal environment.[2] The National Research Council (NRC) has recently issued a major report on contaminated sediments, calling it an environmental issue of national importance.[6] Analyses by

/there, including the Environmental Defense Fund (EDF), agree completely. In a report to be released very shortly, EDF will document the extent of heavy metal contamination in New York-New Jersey Harbor sediments and the inadequacy of current water pollution control programs to limit such contamination.

Sediments are the final resting place for almost all pollutants that enter surface waters, notably mercury, lead, PCBs, dioxins, pesticide residues and even excess nutrients. In spite of widespread and persistent accumulation of pollutants in sediments, there is no consistent, uniform system for assessing what level of risk such accumulation can pose to the aquatic environment. We do know from experience that pollutants can accumulate in sediments to a point where aquatic organisms, the environment and human health are severely impacted. There are numerous incidences of fish and shellfish consumption warnings or bans due to contamination by PCBs, mercury, dioxin, kepone, just to name a few, because of the release of those contaminants by sediments back into the water column. The New York State striped bass fishing ban, caused by PCB-contaminated Hudson River sediments, is just one of numerous incidences of sediment contamination affecting aquatic life and human health. Dioxin-contaminated Blue Crabs in Newark Bay and in the Great Lakes confirm that contaminated sediments are in fact responsible for contaminating aquatic life and threatening human health.

Despite the evidence of deleterious impacts caused by contaminated sediments, there is no system in place for assessing at what point the concentration of a pollutant begins to threaten the aquatic ecosystem. No baseline is available to judge which sediments are accumulating pollutants

that potentially threaten the environment or public health. And existing water pollution control strategies are not adequately preventing the contamination of sediments. In short, we do not know what levels of contamination in sediments are safe, nor what level poses a risk to the environment, until it is too late.

SEDIMENT CRITERIA AND STANDARDS ARE NEEDED TO SAFELY MANAGE DREDGE MATERIALS

Considering the polluted state of many urban harbors, including those in Boston, New York, Baltimore, San Diego, Los Angeles, San Francisco and Seattle, how are we assured that the disposal of millions of cubic yards of dredged sediments truly does not endanger the environment? The U.S. Army Corps of Engineers and U.S. Environmental Protection Agency are responsible for developing guidelines for implementing open ocean dumping criteria set forth in the Marine Protection, Research and Sanctuaries Act (MPRSA.) The guidance manual first written by the EPA and Corps was the 1977 "Green Book", which set guidelines for the permit decision-making process.

EDF believes that the "effects-based" tests used in the 1977 Green Book to evaluate dredge material for open ocean disposal are wholly unsatisfactory and flawed. Serious problems include 1) the use of species in acute bioassays that are particularly hardy and tolerant of pollutants; 2) the absence of important sensitive species used in tests; 3) the unrepresentativeness of sediments to be dredged due to the small number of sediments samples taken; 4) the site from which reference material is taken, which is not assured to be unimpacted by dredge disposal; 5) the short duration time for bioaccumulation

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tests; and 6) long-term effects, sublethal or effects on ecological communities are not predicted nor accounted for.

The "Green Book" has recently been revised, and some of these criticisms may be addressed in this new version. But, its revision was intended only to codify ongoing practices; it does not break new ground by requiring the Corps districts to use substantially different procedures. The revised "Green Book" does not ensure that a consistent set of criteria will be used throughout the nation to assess dredge material, nor does it ensure that contaminated sediments will not be disposed of in the ocean. Nor will this new set of testing protocols do anything to prevent further contamination of sediments by triggering additional controls on point and non-point sources. The effects-based approach used in the Green Book is not a substitute for a uniform set of numeric criteria and standards that should be incorporated into the decision-making process for disposing of dredge material.

In fact, EDF maintains that the current "effects-based" tests used by the Corps and EPA consistently fails to prevent dredge material from contaminating the coastal environment and affecting aquatic life. The Mud Dump site, the location where all sediments dredged from the New York-New Jersey Harbor are deposited, is a classic case in point. In 1973, toxic metals in sediments in the New York Bight were found between 10 to 100 times greater near waste disposal sites than in uncontaminated areas.[7] In 1980, the National Marine Fisheries Service (NMFS) measured body burdens of heavy metals in organisms collected from the Mud Dump Site and found evidence that demersal fish and shellfish from all areas sampled had low to moderate body burdens of both

heavy metals (cadmium, lead, mercury, copper, zinc, chromium and nickel) and synthetic organic pollutants (hydrocarbons and PCBs).[8]

In 1981, NMFS researchers reported that the Mud Dump Site exhibited "considerably elevated concentrations [of lead, copper, silver, mercury, cadmium, iron and manganese] over those observed in sediment outside the deposit and in other natural sediment".[9] In another study, NMFS found reduced populations of benthic species, such as crustaceans (especially amphipods), near the Dump Site.[10] The correlation between absence of species and contaminant levels around the Dump Site is enough evidence to show that impacts from dredge material have occured, and continue to occur after the normal time for recovery after a disturbance. Most recently, researchers are investigating whether dioxin-contaminated lobsters collected from the Mud Dump Site may in fact be contaminated due to dioxin-laden sediments dredged from Newark Bay and the lower Passaic and Hackensack Rivers. Considering these facts, EDF believes the current "effect-based" tests applied by the Corps and EPA is not appropriate to determine "that the dumping [of dredge materials] will not unreasonably degrade or endanger human health...or the marine environment", as required by Section 1413 of the MPRSA.

Congressman Frank Pallone's amendment to HR 2647, the Coastal Defense Initiative, is a positive and constructive one that should resolve some of the management issues related to the Mud Dump Site. In particular, the requirement that sediments meet Ocean Dumping Criteria not withstanding the economic waiver provision in MPRSA (Section 102(a)) is important in ensuring that contaminated sediments are never disposed of at the Mud Dump Site.

However, the development of uniform federal criteria and their use in determining what is appropriate for open ocean disposal are still necessary to ensure that the Mud Dump Site does not continue to receive sediments that are currently degrading the New York Bight. Sediment criteria will significantly enhance Congressman Pallone's amendment by making a fundamental difference in how sediments are determined to be appropriate for open ocean disposal.

THE DISPOSAL OF CONTAMINATED SEDIMENTS MUST CEASE

Even if Section 1413 was properly implemented by the Corps and EPA, a fundamental problem exists. The MPRSA needs to be significantly strengthened by clearly stating that the disposal of contaminated sediments is not allowed. Ocean disposal of contaminated sediments effectively needs to be banned, and Congress needs to take the necessary steps to ensure that such disposal will end. Defining what is and what is not contaminated by using sediment quality criteria and standards is the first step necessary to meet that goal.

The amount of dredge material disposed of in open waters is not insignificant. Through its own survey, the Office of Technology Assessment (OTA) noted that dredge material made up the largest volume of that which is disposed of in coastal waters, maybe by an order of magnitude.[11] Over 400 million cubic yards are dredged every year, according to the OTA, half of which is deposited in marine or estuarine waters; two-thirds in estuaries, one-sixth in coastal waters and one-sixth at ocean sites. The Corps claims that only 3 percent of dredged material from its coastal districts is highly contaminated and in need of special management. But it is difficult to accept

this number since the criteria used by each Corps District varies and no consitent nationwide criteria exists. Even if the Corps estimate is correct (which EDF believes is much too low), OTA calculates that approximately 7 million wet metric tons of contaminated material being deposited in the coastal environment every year.[11]

WATER QUALITY STANDARDS DO NOT PROTECT SEDIMENTS

Water quality standards alone cannot protect plants and animals that depend upon our nation's waters, and pollutants can accumulate in sediments even when the concentration of a pollutant is at or below its water quality standard. For example, in the New York-New Jersey Harbor, even though the 1987 Harbor-wide concentration of mercury was only twice that of the State water quality standard,[13] NOAA found among 136 sites tested nationwide for mercury, that the 6 sites in the Hudson-Raritan and New York Bight topped the list.[4] In San Francisco Bay, chromium is well below federal and state criterion, yet its sediments contain some of the highest chromium concentrations in the nation; 3 of the top 10 sites for chromium contamination out of the 176 surveyed by NOAA were in San Francisco Bay.[4]

Obviously, keeping sediments uncontaminated takes more than just meeting water quality standards. Sediments are not considered when the fate of loadings from point and non-point source pollutants are determined, and are certainly not considered when wasteload allocations are developed or permits are written. Therefore, existing water pollution control strategies are not designed to protect against the eventual contamination of sediments, and

consequently pollutants are building up in sediments throughout the country unabated. Without sediment criteria and standards, NPDES permits and non-point source control strategies will never require the pollution prevention measures necessary so that pollutants will not accumulate in sediments to the point that the environment is adversely affected.

THE PURPOSE OF SEDIMENT QUALITY CRITERIA

Sediment quality criteria must address chronic, acute, lethal and sublethal effects on the entire aquatic community and must consider bioavailable and bioaccumulative effects of contaminants in sediments. When developed by EPA, they should be promptly used to develop sediment quality standards by both the federal government and states.

Developing sediment quality criteria is not straightforward; one has to account for many factors such as the differential availability of contaminants of sediments which contain the same contaminant concentrations; the effects of particle size and organic carbon content on bioassay results and other natural variables. But these complications are not necessarily different from those involved in setting water quality standards (WQS). In setting WQS, EPA and states have had to account for variables such as differential susceptibility of species, differences in chemical form and differences in ambient water chemistry.

Different methods to devise sediment quality criteria must be chosen carefully by EPA to accomodate different regulatory applications and chemicals

involved. There are a variety of methods available to EPA to develop sediment quality criteria that each have their own advantages and disadvantages. EDF believes that EPA needs to put additional resources to strengthen their current effort to establish sediment quality criteria and standards that will meet the various regulatory needs. For this reason, Congress can make a valuable contribution by giving EPA the mandate to develop sediment criteria and standards under a defined time-frame so that they are effectively incorporated into various regulatory frameworks that encompass both marine and fresh waters.

Those frameworks include defining the need to clean up "hot spots", defining what dredge material is safe for ior open ocean disposal and 9
00514ering stricter water pollution control strategies through point source permits and non-point source abatement programs to prevent further sediment contamination. Preventing the formation of new "hot spots" and avoiding the expense of cleaning up highly contaminated sites is the most far reaching and critical role that sediment quality criteria and standards will play.

Current coastal protection legislation under consideration by the House and Senate do take steps to achieve this objective. The Coastal Defense Initiative is an important measure that, among other things, calls for the development of sediment quality criteria by EPA and standards by the states. Both Senator Mitchell and Senator Moynihan's bills are also important pieces of legislation that have merit with respect to contaminated sediments and how they are managed. EDF supports the intents of these bills and urges the House Public Works and Transportation Committee to study their elements and consider

them as possible complements or additions to the Coastal Defense Initiative. It is extremely important that coastal protection legislation include provisions that set the goal of ending the open water disposal of contaminated sediments, mandate the development of sediment quality criteria and standards and require the application of such criteria and standards in regulatory decisions. EDF urges this Committee to work towards achieving passage of coastal protection legislation this session. It is imperative that Congress not lose the opportunity to start changing how contaminated sediments are assessed, categorized, managed and most importantly, prevented from occuring in the first place.

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DEPARTMENT OF THE ARMY
OFFICE OF THE ASSISTANT SECRETARY OF THE ARMY
(CIVIL WORKS)

COMPLETE STATEMENT

OF

DR. G. EDWARD DICKEY
ACTING PRINCIPAL DEPUTY ASSISTANT SECRETARY

BEFORE THE SUBCOMMITTEE
ON
WATER RESOURCES

COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

U.S. HOUSE OF REPRESENTATIVES

SEDIMENT QUALITY
MAY 15, 1990

INTRODUCTION

Mr. Chairman and members of the Subcommittee I am pleased to be here today on behalf of the Department of the Army to discuss the issue of contaminated bottom sediments and the status of Federal efforts to address this problem. Accompanying me today is Dr. Robert Engler, Senior Scientist and Manager of Environmental Effects of Dredging Programs, with Army's Environmental Laboratory, Waterways Experiment Station, Vicksburg, Mississippi.

Your letter of invitation requested that we discuss recent changes in the dredged material testing manual and efforts to develop new technologies for remediation and cleanup of contaminated sediments. In addition, your letter invited us to discuss contaminated sediment legislation presently proposed in both Houses of Congress.

ARMY PROGRAMS RELATED TO CONTAMINATED SEDIMENTS

Before commenting on the specific issues of contaminated bottom sediment, the testing manual and other topics, I would like to provide some background on Department of Army programs

relating to the overall management and regulation of dredged sediments within our navigable waterways. The Army administers several major civil works programs, two of which play a critical role in the protection, management, and development of our Nation's natural resources. First, the Army's dredging program fulfills our mission to provide for the maintenance of a safe and reliable navigation system within the United States. This Army Corps of Engineers program is indispensable to the viability of the Nation's extensive system of commercial channels, harbors, and ports, which, in turn, is essential to the economic well-being and defense capability of the United States.

Second, the Army operates a regulatory program also through the Army Corps of Engineers. This responsibility includes authority to regulate the discharge of dredged or fill material into waters of the United States under Section 404 of the Clean Water Act (CWA), all work and structures in navigable waters of the United States under Section 10 of the Rivers and Harbors Act of 1899, and the transportation of dredged sediments for the purpose of ocean dumping under Section 103 of the Marine Protection, Research and Sanctuaries Act (MPRSA).

Research and Development

Since 1973, the Corps has expended well over $100 million on environmental research and development directly related to our responsibility to maintain and improve navigation and to work with EPA to classify sediments as to contamination potential and regulate dredged sediment disposal in both a cost-effective and environmentally sound manner. We see this research commitment as a continuing high-priority requirement due to the complexity of evaluating sediment contamination and the environmental sensitivity of our waterways.

We spend about $1.2 million each year on research activities specifically related to testing, assessment, and classification of highly contaminated sediments. This research and development investment has paid significant dividends through the numerous innovative and cost-effective approaches that have been developed for managing both contaminated and uncontaminated dredged sediments.

Program for Managing Contaminated Bottom Sediments

The projects and research activities undertaken by the Corps are principally for navigation and flood control purposes. The Corps is not authorized to conduct projects involving environmental cleanup dredging per se. As you know, a benefit-cost analysis must be performed to determine if sediment removal for navigation or flood control is economically

justified. If, in the case of contaminated project reaches, the benefits of the overall project do not exceed the costs, the Corps cannot proceed with the project. As such, if work is to commence, another Federal or non-Federal entity must fund the project under separate cleanup responsibilities and authorities.

Within our navigation mission and regulatory authority, we continue to maintain an aggressive scientific and engineering role in contaminated sediment management through our research and development programs, pilot demonstrations of innovative dredging and disposal alternatives, and in work for others.

SCOPE OF THE PROBLEM

At present, our national dredging program involves the removal, disposal, and management of about 300 million cubic yards (mcy) of dredged sediments each year to maintain this Nation's extensive Federal navigation system. This waterway system includes over 25,000 miles of Congressionally authorized and Federally maintained navigation channels serving 41 of the 50 states. Nationwide, another 100-150 mcy of sediments are dredged and disposed of each year under permits issued by the Corps of Engineers.

Specifically within coastal waters, some 200-250 mcy of sediments are dredged each year by both Federal and non-Federal interests. Of this volume, about 60 mcy of environmentally acceptable dredged sediments require disposal at ocean sites each year. We presently have 105 active ocean dredged material disposal sites serving 98 coastal navigation projects and 40 to 45 active ocean disposal permits. Use of these sites is subsequent to a rigorous testing, assessment, and classification pursuant to the MPRSA and is deemed environmentally acceptable. Of our active ocean disposal sites, 58 are within the three-mile territorial sea with most of the remainder being located within 5 miles of shore.

Extent of Dredged Contaminated Sediment

Only a small percent of the sediments we dredge each year are currently classified, after a vigorous effects-based testing approach, as contaminated to the extent that they are unsuitable for aquatic disposal. While the percentage is small, the actual volumes requiring special handling are still quite large, ranging from about 3 to 10 million cubic yards each year. These contaminated materials are then disposed into appropriate confinement facilities and carefully managed or are not dredged. The volume of this material may increase once our new testing manual, which uses more sensitive effects-based testing, is put

into use. The small percentage associated with our Federal program is not surprising when one considers that most Federal channels have been periodically dredged for many years which tends to minimize contaminated buildup in the channel shoals. Also, these channels are often located in higher energy areas of our waterways and are subjected to frequent turbulence which collectively tend to minimize contaminant buildup. Moreover, recently deposited sediments tend to be cleaner due to increased regulation of point and non-point discharges. Within our navigation program, highly contaminated dredged sediment usually is found in heavily industrialized inner harbor areas and channel reaches which have not been dredged for many years and where point and non-point discharges were not properly controlled.

While in-place sediment contamination has been identified as a high priority concern within the Great Lakes Region, it also is a significant national issue. We receive numerous requests for both direct and consultative technical assistance in this area from many sources throughout the Nation. In addition, of the 1,500 hazardous waste sites that the EPA Superfund Program has identified as high priority for cleanup, the National Ocean and Atmospheric Administration (NOAA) estimates that at least 95, excluding the Great Lakes, may seriously threaten marine resources. This probably is a conservative estimate as waterway-related cleanup requirements have only recently begun to receive the same level of attention as land-based requirements.

CLASSIFICATION AND SURVEYING OF CONTAMINATED SEDIMENTS

Significant efforts are underway to classify marine sediments found in navigation channels dredged by the Army Corps of Engineers. The classification is a result of the Corps applying the effects-based testing and assessment techniques pursuant to EPA's Clean Water Act Section 404(b)(1) Guidelines and Ocean Dumping Act Section 103 Criteria. Important in this classification is the definition of contaminated sediments used by the Corps in regulating dredged material disposal pursuant to our legislative mandate.

Definition of Contaminated Sediments

Contaminated sediments are defined to be those that have been demonstrated to cause an unacceptable adverse effect on human health or the environment. The demonstration of effect is carried out through application of effects-based protocols developed by the Corps and EPA for testing and assessing potential placement locations (e.g., ocean, estuarine, or on land) and identifying that fraction of dredged sediment with the greatest potential for adverse effect (e.g., liquid phase on

water column; effluent from a contained disposal facility; solid phase impact on bottom dwelling or upland organisms). This definition for contaminated sediments is fully consistent with the spirit and intent of the Clean Water and Ocean Dumping Acts and is implemented through application of the above-mentioned Guidelines and Criteria. As long as the definition of contaminated sediments remains an effects based definition, it will be fully consistent with the CWA and ODA.

Handling of Contaminated Sediment

If the sediment that we dredge to construct or maintain a project is believed to be contaminated, we perform biological and chemical evaluations which are state-of-the-art techniques developed in conjunction with the EPA to predict the effects on the environment. These tests, known as "bioassays", are performed in a simulated marine environment and are designed to determine the potential impacts of the contaminants on aquatic plants and animals. They do not measure the chronic toxicity. Since contaminated sediments have the potential for environmental harm they require some level of special handling or restrictions upon disposal. Such special restrictions may include the need to confine contaminated material in upland sites or "cap" the material with clean sediments in constructed pits within open water.

However, before a final disposal option is selected, it is necessary to consider all practicable alternatives to ensure overall coastal environmental protection while using cost-effective technologies. No disposal option is categorically better than another as operational, economic, environmental and social factors vary greatly among dredging projects. Moreover, the physical, chemical, and biological characteristics of sediments vary significantly from one waterway to another and even within an individual waterway. The differences reflect variances in natural mineral composition and water quality as well as the nature of past and present pollutant discharges and sources in the area. In the specific case of dredged sediments, a comprehensive coastal disposal management strategy for dredged material which incorporates this significant variability is not only scientifically justified, but also is essential in providing for the sound and effective management of all coastal dredged material disposal activities.

ALTERNATIVES FOR DISPOSAL OF CONTAMINATED SEDIMENTS

There are numerous alternatives for the disposal and management of contaminated sediments. These include contained land disposal facilities with appropriate controls on effluent,

leachate, volatiles, bioaccumulation, and future use potential of the site after filling. These controls could be minor or extensive depending on the nature of contamination or the disposal site environs. The controls could include but are not limited to liners, leachate collection devices, effluent treatment, soil covers, flocculants, solidifying agents, special excavation and disposal equipment and others. Similar facilities could be constructed in water as an emergent island with the above controls applied as appropriate. A third alternative is confined aquatic disposal where the material is placed in an underwater pit and covered with clean material. Appropriate controls would also have to be placed on all steps of this operation. The "no action" alternative is also an important evaluation in the context of alternative evaluation and selection. There is, however, no preferred or recommended alternative. The selection of an appropriate alternative is based not only on the amount and characteristics of contaminated material but also, on the availability and characteristics of the various disposal alternatives. No individual alternative is a panacea in managing contaminated sediments.

TESTING PROCEDURES FOR DREDGED MATERIAL

The Corps and EPA jointly promulgate the technical assessment and testing protocols for dredged sediments. This is done through established joint technical working groups and joint publication of the testing manuals. Cooperative research is also conducted on the identification, assessment and management of contaminated sediments. These efforts include District and Regional offices, research laboratories, and appropriate headquarters staff of both agencies. These technical groups address national issues such as revisions of the Ocean Dumping Manual or regional problems such as dioxin contamination in New Jersey sediments.

Effects-based Approach to Predict Environmental Consequences

An extremely high priority within the Corps national dredging program at present is the ongoing initiatives with EPA to revise and update, where appropriate, our Federal environmental regulations and guidelines for evaluating proposed discharges of dredged sediment. As I indicated earlier, we use an effects-based testing approach to classify sediments and to estimate environmental consequences of dredged sediments disposal. While this approach requires highly trained professionals and has come under increasing scrutiny in recent years due to its complexity, it is an ecologically conservative approach for acute toxicity while bioaccumulation potential can be estimated for maximum exposure and remains the accepted

standard for dredged sediment evaluations by the international scientific community. The effectiveness of this approach is clearly borne out by results of long-term monitoring undertaken by the Corps and others over the years at many of our major operational disposal sites and through extensive surveys of each of our 100 plus historically-used ocean disposal sites. Many of the latter sites have been in use for 3 or more decades. We have not observed adverse impacts attributable to sediment contamination at any of these sites.

Dredged Material Testing Manual

The Corps and EPA are jointly updating and revising their procedures for evaluating both ocean disposal and inland coastal and freshwater disposal to reflect the current state-of-the-art in testing procedures and in management of the Corps regulatory program. The "Green Book", which contains proposed revisions to the technical implementation guidance for ocean disposal, was recently released for a 6-month public comment period. These proposed revisions which use a "tiered testing" approach should prove to be more cost-effective based on our experience in defining appropriate sediment testing requirements for site-specific applications. The "tiered testing" uses a typical testing approach that increases in comprehensiveness and sensitivity as potential for contamination increases. On the other hand, as the procedures reflect state-of-the-art and are more environmentally sensitive, the individual tests will be more expensive to conduct and may prove to be more environmentally conservative than at present. In addition, at some point the manual may need to be further revised, once methods are developed to measure chronic aquatic life effects, and human health effects.

An equally important objective of this revision process will be greater consistency in testing procedures within the coastal zone and between regions of the country. Currently, the CWA and MPRSA use slightly different approaches to evaluating sediments in dredging proposals. We are working intensively with EPA to develop a comprehensive coastal disposal management strategy and associated technical implementation guidance for all dredged material disposal activities undertaken within the coastal area. Our proposed approach in this area is to develop and apply a consistent evaluation framework for sediment contamination testing and to provide effective controls of contaminated sediments for the full array of available disposal options.

TECHNOLOGY REQUIREMENTS

Much scientific and engineering developmental work has been accomplished in the area of management of highly contaminated bottom sediments and much work is presently ongoing. We fully agree with the conclusion of the recently completed study by the Marine Board of the National Academy of Sciences that existing technology for contaminated sediment cleanup and remediation is presently adequate in most cases. In fact, it is our opinion that while there are certainly significant procedural and authorization differences, technically there is no major difference between navigational dredging and environmental cleanup dredging.

A major requirement that we initiated with EPA, as part of our collective efforts to develop a comprehensive disposal management strategy for dredged sediments, is to bring together the considerable available international literature into a comprehensive technical reference on contaminated bottom sediment management for more effective implementation by our field offices.

I also should make note that a beneficial spin-off of our commitments in the area of contaminated sediment research and development is that the Corps is now recognized internationally as a leader in all aspects of dredging-related environmental research. Indeed, other nations actively seek the Corps advice on environmental and engineering aspects of dredging and dredged material disposal matters, including dredging and disposal of highly contaminated bottom sediments.

Over the years, the Corps has generated a substantial data base on classification of contaminated dredged sediments within our vast waterways system. In subsequent efforts to define better the magnitude and extent of contaminated sediments problem within our waterways, these existing data should prove quite valuable in developing cost-effective, area-specifc sampling plans and priorities for such sampling activities. However, as these data are collected to demonstrate regulatory compliance and are obtained from very limited channel or dredging site areas of these waterways, they have only limited utility in defining site-specific contamination hot spots or in defining site-specific remediation requirements.

International Cooperation

We also keep apprised of world-wide advances in dredging and disposal of sediments through such technology exchange mechanisms as Memoranda of Understanding with Japan and the Netherlands. In fact, much of the operational experience with existing clean-up technologies for removal and disposal of highly contaminated bottom sediments has been in these two countries. We also actively participate in the London Dumping Convention, as Dr.

Engler is in his third term as Chairman of the Scientific Group to that Convention. Further, we have been meeting with success since 1975 with other participants in the Convention to resolve issues related to waste management in the oceans. These efforts also keep us fully informed of both the problems and solutions in other countries.

COORDINATION WITH OTHER AGENCIES

In addition to the work that the Corps undertakes to carry out its authorized missions, it frequently provides engineering, construction management, and research and development support on a reimbursable basis to other agencies. Many agencies faced with major construction programs or other needs do not have the capability to manage these technical functions. The Corps support allows our clients to concentrate scarce resources on their primary mission. The Corps is currently assisting other Department of Defense agencies and the (EPA). Since 1987, we have managed the expenditure of over $800 million for cleanup and remediation work at the request of these agencies.

New Bedford Harbor, Massachusetts

An example of the work we have recently completed for the EPA is the major engineering feasibility study and pilot demonstration for the New Bedford Harbor Superfund Site in Massachusetts. Because dredging was associated with four of the five cleanup alternatives identified by EPA, it sought assistance from the Corps to carry out a major laboratory evaluation and field investigation of dredging and dredged sediment management options for the highly PCB contaminated sediments. The technical approach selected was the Corps management strategy for testing, evaluation and disposal of the dredged material. This highly successful study effort has demonstrated new physical, chemical, and biological assessment techniques and remedial strategies. These results will have nationwide application in the management and remediation of highly contaminated bottom sediments.

In recent years, we have also had several opportunities to undertake pilot scale demonstrations using innovative dredging equipment and disposal technologies for removal and handling of contaminated sediments to evaluate the effectiveness of these procedures and equipment. I mentioned earlier the New Bedford Superfund project. A similar demonstration of innovative dredging and disposal equipment was also recently completed at Indiana Harbor on the Great Lakes.

Corps of Engineers and EPA Joint Initiatives

In specific regard to management of highly contaminated bottom sediments, the Corps and EPA recently completed a 6-year cooperative demonstration project to field verify

state-of-the-art techniques for assessing environmental impacts of placement of contaminated sediment in aquatic, constructed upland, and wetland environments. This work provided the first opportunity for direct comparison of the environmental consequences of using the same dredged material under a broad range of disposal conditions. Another research effort involves developing guidelines for dredging highly contaminated sediment and methods to control the adverse environmental effects due to dredging operations.

We are also involved in assisting EPA and several states on other Superfund sites where dredging is being considered as one option for remediation. Several of these are in close proximity to Federal navigation projects and have had a direct impact on our ability to maintain viable navigation projects in these areas.

Waukegan Harbor, Illinois

One such example is the cleanup of Waukegan Harbor, Illinois. Slip 3 at the harbor is designated as a Superfund Site. Between this site and the Federal navigation channel is about 135,000 cubic yards of highly contaminated material that must be removed before the Corps can dredge the harbor. At the present time we are negotiating with the State to develop an appropriate distribution of costs and responsibilities for dredging the navigation channels and removing other contaminated sediments.

Great Lakes Initiatives

I would like to mention one other Corps/EPA effort involving the Great Lakes. In late 1988, we entered into an agreement with the EPA to implement Section 118 of the Clean Water Act. The five-year study and demonstration, entitled "Assessment and Remediation of Contaminated Sediments Study", relates to the control and removal of toxic pollutants from bottom sediments. The Act specifically identifies five areas of concern as priority locations for conducting the demonstrations. They are Saginaw Bay, Michigan; Sheboygan Harbor, Wisconsin; Grand Calument River, Indiana; Ashtabula River, Ohio; and Buffalo River, New York. The Corps is chairing the Engineering/Technology Work Group. The Waterways Experiment Station will test and evaluate physical, chemical, and biological remediation techniques.

PENDING LEGISLATION

At present, the importance of dredging to maintain critical navigation for national defense and the economy is clearly recognized in both the MPRSA and the CWA. We urge that any future amendments to these statutes continue to safeguard our ability to maintain important commercial and national defense

navigation channels through dredging and disposal of dredged material in an environmentally responsible and economical manner and that the Army have a major role in resolving sediment related issues.

The Department of Army believes that there is no need to alter substantiyely either the CWA or the MPRSA at the present time with regard to the specific technical provisions which regulate dredged material disposal. The Army believes that these statutes now provide for well-reasoned consideration of all practicable alternatives for the disposal of dredged material through scientifically valid assessment protocols.

We recognize that contaminated sediments can be a problem in the environment. In fact, we have been at the forefront of research on this topic and on alternative ways to handle contaminated sediments. We also realize that the activity of dredging involves the removal of sediment deposits from one location to another, and where contaminated sediments are involved, this can present a risk to the environment. However, it is our view that current environmental reviews and sediment classification procedures, which are completed under existing laws which relate to dredging proposals, whether accomplished by the Federal government itself or by private industry under Federal permits, provide for adequate consideration and protection of environmental and public health and safety interests.

Views on Current Legislation

Both Houses of Congress are considering legislative proposals to amend the CWA and the MPRSA in an effort to expand regulation of activities in marine and coastal waters. Rather than commenting on specific provisions in any bill, I would like to comment in general terms on those provisions which we view as scientifically unjustified and, in turn, technically indefensible for the foreseeable future in regulating dredged sediment disposal. Among other measures, these bills would: establish numerical sediment criteria and standards for coastal waters; and establish new regulatory strategies under both the MPRSA and the CWA for management of dredged sediments which are found to exceed such numerical sediment quality standards. While we support continued review of CWA and MPRSA to ensure proper emphasis and focus on environmental protection, these provisions (especially those related to numerical standards), if implemented without proper research and coordination, would not afford increased environmental protection and in some cases could be less environmentally effective than existing procedures.

At the present time, it is the Corps' opinion that it is beyond current technical knowledge to develop scientifically-based numerical sediment quality standards that embrace an adequate knowledge of cause-and-effect relationships

of sediment-associated contaminants. The geochemical interrelation of sediments and overlying waters is extremely complex. Presently, it cannot be quantified in a way that relates the concentration of a single chemical or group of chemicals in a sediment matrix of natural and man-made components to an impact of a contaminated sediment. The conclusion of scientific studies to date has been that the Corps/EPA effects-based testing, using a broad array of tests, is a scientifically valid and defensible approach that can effectively be applied in regulatory decision-making for proposed dredged material disposal activities. This subject recently was given significant attention by the London Dumping Convention, which resulted in the development of separate technical quidelines for testing and management of ocean dredged material disposal, and by the Marine Board of the National Research Council.

Legislation that would incorporate sediment classification, contaminate identification, and clean-up strategies are absolutely necessary in enhancing the environmental viability of our coastal waters. The Army fully supports the need for management and clean-up of contaminated sediment. However, any proposed legislation should be based on the above mentioned effects-based procedures.

CONCLUSION

Our Nation's vast coastal, Great Lakes, and inland waterways systems represent an important biological and economic resource. Protecting and managing this resource is everyone's concern. We strongly support a cooperative effort to prevent degradation of this resource. We believe that Congress and the Administration can work together to improve the environmental quality of our waterways so they can continue to serve vital national interests such as providing food, recreational opportunities, and navigation.

Mr. Chairman, this concludes my statement.

STATEMENT OF COMMISSIONER CHARLES DUSSEAU OF DADE COUNTY, FLORIDA BEFORE THE SUBCOMMITTEE ON WATER RESOURCES ON ISSUES CONCERNING SEDIMENT QUALITY AND CRITERIA MAY 16, 1990

I appreciate the opportunity to appear before you today concerning Dade County's need to have sediments removed from the Miami River and its tributaries for navigation and environmental purposes. Since you have already heard ample testimony, I will make my presentation brief and to the point.

It is currently estimated that more than 800,000 tons of goods valued at more than $2 billion are shipped annually from the ten largest terminals along the Miami River. It is also estimated that the shipping industry along the Miami River contributes $200 million to the local economy and provides approximately 10,000 full-time jobs. The majority of the shipping terminals along the Miami River service the Caribbean Basin and the level of shipping traffic along the River has steadily increased as a result of the Caribbean Basin initiative which was promulgated under the Reagan Administration. It is our belief that commerce along the River and the shipping trade will undergo dramatic increases when trade relations with Cuba improve. Therefore, it is critical that the navigation channel of the Miami River be restored to its original project depth through the maintenance dredging project which has been proposed.

With respect to the environmental need for the project, it should be noted that the sediments are highly contaminated in portions of the Miami River. These contaminated sediments pose an environmental threat to Biscayne Bay, which is a State Aquatic Preserve and a portion of which is a National Park, because the Miami River is the major tributary of Biscayne Bay. Currently, River sediments are disturbed and resuspended by vessel traffic and the contaminants are ultimately carried into Biscayne Bay. Inasmuch as State and local efforts to identify and eliminate the flow of contaminants into the River have produced promising results, the contaminated sediments in the River must ultimately be removed if we are to achieve our goal of restoring and enhancing the water quality of the Miami River and Biscayne Bay.

While it is imperative that the contaminated sediments in the River channel, as well as the sediments in adjacent berthing areas and River tributaries be removed, the disposal of the sediments must be accomplished in an environmentally acceptable manner. The disposal of the River sediments poses a difficult problem since the sediments are highly contaminated in portions of the River as previously discussed. Therefore, we are recommending that careful consideration be given to alternative methods of dredging and disposal of the sediments to ensure an environmentally acceptable project.

In summary, it is essential that the Miami River dredging project be designed to remove all of the sediments in the Miami River and its tributaries in an environmentally sound manner in order to meet the current and future economic demands placed on the River.

Testimony Presented by: Commissioner Charles Dusseau on behalf of the Board of County Commissioners of Dade County, Florida
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SIERRA CLUB

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STATEMENT OF BRETT D. HULSEY

SIERRA CLUB CONTAMINATED SEDIMENTS SPECIALIST

MAY 16, 1990

ON THE NEED FOR NATIONAL SEDIMENT LEGISLATION

BEFORE THE SUBCOMMITTEE ON WATER RESOURCES,

HOUSE PUBLIC WORKS COMMITTEE

CHAIRED BY THE HONORABLE HENRY NOWAK

ON BEHALF OF THE SIERRA CLUB, GREAT LAKES UNITED, AND

THE LAKE MICHIGAN FEDERATION

"When we try to pick out anything by itself, we find it hitched to everything else in the universe" - John Muir

National Headquarters: 730 Polk Street, San Francisco, California 94109 (415) 776-2211

On behalf of the Sierra Club, I thank the Chairman and the subcommittee for holding this hearing on contaminated sediments legislation and for inviting me to speak. My name is Brett Hulsey, and I direct the contaminated sediments program for the Sierra Club. Today I am here to urge this subcommittee to enact comprehensive federal legislation to control and remediate contaminated sediments. I also speak on behalf of the Lake Michigan Federation and Great Lakes United representing over 750,000 people nationwide and 200,000 people in the Great Lakes basin. The Sierra Club has made contaminated sediments a priority issue for several years through our Great Lakes Washington Weeks, meetings with EPA and Corps of Engineers officials, and educating our membership. To exemplify this commitment, I have included a contaminated sediment article from the last issue of Sierra Magazine with our testimony.

Toxic muck is one of the top Great Lakes priorities for the Sierra Club, Great Lakes United, and the Lakes Michigan Federation. In January these organizations joined over 200 groups from all over the nation to endorse the Citizen's Charter on Contaminated Sediments. The Charter, a copy of which is included with this testimony, outlines a specific national strategy for Great Lakes and marine sediments which we urge the committee to adopt. In March, we released The Great Lakes Federal Agenda for the 1990s: Implementing the Great Lakes Water Quality Agreement to provide targets for Congress, the Administration and other decision makers throughout this decade to protect and restore the Great Lakes. I have a copy of the Agenda and will provide it for the record. In the Agenda, we recommended that Congress and the Administration comply with the Great Lakes Water Quality Agreement, a ratified international agreement, by enacting comprehensive contaminated sediment criteria and control legislation.

In addition to new legislation for contaminated sediments comprehensive clean-up, there are several other actions that Members of this Subcommittee can take to clean up sediments. Section 118 of the Clean Water Act has given us a sound mechanism to demonstrate much needed sediment control technologies at five sites in the Great Lakes. The Assessment and Remediation of Contaminated Sediments Program (ARCS) is being implemented by EPA and the Corps of Engineers at this time. The ARCS program needs your continued strong support. Demonstration projects need to be expanded to saltwater coasts to test technologies there. The Great Lakes Water Quality Improvement Act and the Fish and Wildlife Restoration Act, both recently introduced by Mr. Nowak, are major steps to comply with the Great Lakes Water Quality Agreement and provide much needed deadlines, focus and resources for the additional Great Lakes restoration. Air deposition of persistent poisons into the Lakes is a major source and adds to the sediment pollution. Therefore, we also urge subcommittee members to vote to strengthen the permit, enforcement clean auto, and coastal protection sections of the upcoming Clean Air Act to slow Air Toxics deposition in the lakes. But our major hope is that this subcommittee will move quickly to introduce national legislation to deal with contaminated sediments.

This issue is of paramount importance because the ecological state of our fresh and salt water coasts is not improving. As you know, toxic sediments impede beneficial uses in forty-two of the forty-three Great Lakes Areas of Concern. Moreover, EPA's March 1990 National Water Quality Inventory documents that only one out of twelve miles Great Lakes shoreline achieved the desired water uses (fishable, swimable) designated by the Clean Water Act. Only one in three miles

of Great Lakes shoreline meet the fishable goal for water use. "The main reason for these fishing restrictions," according to EPA, "Is contamination of sediments by toxic chemicals such as priority organics."

The problem of toxic sediments and toxic fish came to a head last year when controversy erupted over renewed health advisories from eating Great Lakes fish. The effects of these advisories are still being felt in the sport and commercial fishing industries. Two years ago, Boston Harbor and medical wastes issues gripped the country and demonstrated the high level of public concern for the health of the nation's coasts. We hope that this summer's papers will read that Congress takes a tough stand to rid our coasts of contaminants.

Over the past four years, many experts have testified before this subcommittee on the effects of these poisons on Great Lakes' organisms. Recent research quantifies the extent of the contamination and indicates that it may be worse than previously thought. This research indicates that 1/3 of the PCBs in Lake Michigan leech from contaminated sediments. The majority of the other PCBs come from the air. PCBs are, of course, the principal fish contaminant in Lake Michigan. Contaminated sediments are currently the least regulated and controlled poison in our waters. We need a comprehensive program to remediate sites other than the ARCS demonstration sites. Also the program should address the significant threats to the nation's saltwater coasts, bays and harbors, as other speakers have mentioned.

It is clear that we will not have effective cleanup of our waters and fish in this century unless we have a comprehensive national program soon. Specifically, as detailed in the Citizens Charter, Congress should direct EPA to develop sediment quality criteria, require states to develop and enforce uniform standards, conduct a national inventory of sites in the salt water and the Great Lakes regions, and provide funds for the program.

This subcommittee has made great strides to protect our coasts, but the fate of the Great Lakes still hangs in the balance. Studies show continued and lasting threats to children who eat Great Lakes' fish, and toxic mercury continues to accumulate in sediments in remote Northern Minnesota lakes. Even our most pristine lake-- Lake Superior-- has contaminated sediments throughout the lake. PCB sediment levels are as high as 147 parts per billion in our cleanest lake as the accompanying article illustrates. The highest levels reported were outside the Areas of Concern.

But as we stand at the beginning of the 1990's, one must wonder if American children born today will ever be able to drink the water, eat the fish, swim on the shores, and breath the air without wondering if they are safe. We urgently request this subcommittee to develop and introduce a contaminated sediments bill covering the points in the Citizen's Charter. Moreover, we also need your leadership to pass this legislation in this Congress. We from the Great Lakes think this would be the best vote for healthy children, clean cities and coasts, and safe fish. Please continue you work to restore the lakes.

Thank you.

Sierra, May/June 1990

CLEAN WATER

The Dirty Deeps

The nation's waterways are pollution sinks—where poisons stay out of sight, but not out of circulation.

Beth Millemann

IMAGINE THAT you haven't washed your bathtub in six months. You turn on the tap, anticipating a cleansing bath. But as the clean water swirls around the tub, it dislodges half a year's worth of scum and turns muddy brown. Looking into your tub, you realize something that many federal bureaucrats, a number of port authorities, and more than a few members of Congress still have not: Water can't be clean if its container is filthy.

Many of the containers that hold America's fresh and salt water—bays, harbors, lakes, and riverbeds—are lined with toxic grime. When water flows over, or rests on, these contaminated muds—or as they are dredged for navigation—pollutants such as DDT, PCBs, and heavy metals are released. These toxins are eaten by swimming or mud-burrowing organisms that are in turn consumed by fish and their predators, including humans. Deformed birds, contaminated shellfish, cancerous fish, and threats to human health are the result of this toxic food chain.

Although there's no comprehensive inventory, a 1987 EPA study showed that nearly every major U.S. harbor and body of water likely suffers from sediment contamination. In the Great Lakes alone, 41 severely polluted sites have been identified. The news from the saltwater coasts is equally grim. Exposure to underwater sediments is directly responsible for diseased and toxic fish in such places as Washington's Puget Sound, Santa Monica Bay in California, and New Bedford Harbor in Massachusetts.

Dredging for a pipeline in Puget Sound stirs up old pollution problems.

In such underwater wastelands, sediments have soaked up pollutants from landfills, sewage plants, and other sources. "Underwater sediments are the last stop for everything from pesticides sprayed on fields to heavy metals released into the air," says Brett Hulsey, associate Midwest representative of the Sierra Club. "Lake beds

and bay bottoms eventually catch almost everything that we put into the environment."

If sediments are toxic when left alone, they are even more dangerous when stirred up by dredging equipment, releasing toxins like a sponge being squeezed. Some of the most contaminated sites in the country are those that must be cleared of silt regularly to facilitate shipping and commerce: New York's Hudson/Raritan estuary; the Boston, San Diego, Los Angeles, and Seattle harbors; and the Indiana Harbor and Canal in Lake Michigan. To keep such areas navigable, the U.S. Army Corps of Engineers annually dredges 350 million cubic yards of sediment from the bottom of the nation's waterways—enough to encircle the Earth with a cubic yard of muck eight times.

Once the dredging is done, another challenge looms: how to dispose of the spoils. The Corps throws sediments judged safe on riverbanks or wetlands—or dumps them into the ocean at the rate of 45 million cubic yards a year. Because no federal standards exist for sediment toxicity, the Corps uses its own tests, with EPA oversight, to determine which sediments are too dangerous to dump. It places these wastes in upland sites or in Confined Disposal Facilities (CDFs), holding ponds bordered by the shore and encircled by walls of fill.

At best, CDFs are a short-term fix to the disposal problem, according to Glenda Daniel, executive director of the four-state Lake Michigan Federation. "The CDFs are rarely fenced or covered or even marked by warning signs," she says. "In Chicago, for instance, children swim and anglers fish in a CDF adjacent to a public park."

Despite the magnitude of the sediments problem, no national program directly addresses underwater contamination. The EPA has no national criteria that restrict pollution of underwater sediments or that trigger cleanup and protection—nor any fund to pay for such measures. Existing environmental laws place some restrictions on dredging and dumping, but the Corps makes its own decisions on which sediments are too toxic to dump.

To send a clear message for change, a coalition of more than 225 labor union, fishing, sporting, citizen, health, and environmental groups, including the Sierra Club, has drafted what it calls a Citizen Charter on Contaminated Sediments. The document calls on Congress to establish and adequately fund a national sediments program aimed at aggressively controlling new underwater pollution and cleaning up the old. The charter also calls for an end to open-water disposal of contaminated sediments.

Some Corps and port officials argue that such a program would effectively stop ocean dumping of dredge materials—and might therefore result in undredged harbors too clogged with silt to navigate.

Reformers say the public need not choose between the unpleasant extremes of polluted oceans and silted harbors. New decontamination technologies being applied to Great Lakes sediments look promising, they say. Microbes and fungi have been used to decontaminate some sediments, and chemical and electrical methods have been successful elsewhere.

At press time in April, charter backers were focusing on action in Congress, working to strengthen the sediment provisions in Senate Majority Leader George Mitchell's (D-Maine) coastal pollution legislation, S.1178, and waiting for sediment legislation being drafted by Representative Henry Nowak (D-N.Y.) to emerge in the House.

As Congress deliberates, the list of underwater wastelands continues to grow, taunting a regulatory system that ignores their existence. But Congress and some members of the public have at least been warned. There is no safe harbor. ■

Beth Millemann is *executive director of the Coast Alliance, a Washington, D.C.–based coalition of coastal activists, and author of* And Two If by Sea: Fighting the Attack on America's Coasts.

Agency Washington, D.C. 20460 March 1990

Office of Water

National Water Quality Inventory
1988 Report to Congress

The Great Lakes

Support of Designated Uses

The Great Lakes hold one-fifth of the world's fresh water and are so large that in many ways they might better be considered as freshwater inland seas. Major urban and industrial centers such as Chicago, Detroit, Gary, Toledo, Toronto, and Buffalo are located along their shores. They serve as receiving waters for the municipal and industrial dischargers in many of these urban areas and are also affected by a myriad of other sources including urban and agricultural runoff, hazardous waste sites, pollution brought by tributaries, and atmospheric deposition. Despite these influences, the Great Lakes have immense recreational and commercial value and are unique, vital natural resources.

In their 1988 State Section 305(b) reports, six of the eight Great Lakes States provided information on the extent to which their Great Lakes shoreline miles attain the uses for which they have been designated (see Table 3-1). A total of 4,479 miles were assessed—all of the shoreline miles in these States and 87 percent of the total number of Great Lakes shoreline miles in the U.S. Eight percent of assessed miles, or 372 miles, were found to be fully supporting uses, and 4 percent of these were determined to be supporting but threatened. Eighteen percent of assessed miles (819 miles) were reported to be partially supporting uses, and 73 percent (3,288 miles) were reported as not supporting uses (see Figure 3-1).

Table 3-1 gives further evidence of the variability of State reporting and assess-

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e 8-1. Designated Use Support in Great Lakes

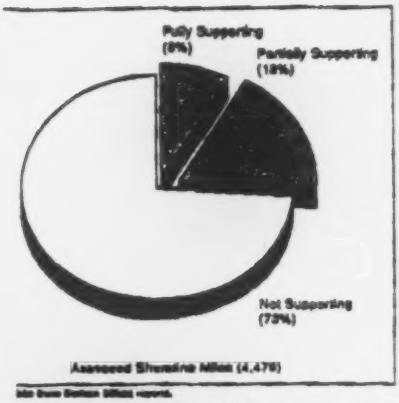
te	Total Shoreline Miles	Shoreline Miles Assessed			Miles Fully Supporting	Miles Threatened[a]	Miles Partially Supporting	Miles Not Supporting
		Total	Percent Evaluated	Percent Monitored				
ois	63	63	0	100	0	0	63	0
iana	43	43	0	100	0	0	43	0
higan	3,288	3,288	0	100	0	0	0	3,288
nesota	272	272	0	100	272	—	0	0
v York	577	577	0	100	100	16	477	0
o	236	236	—	—	0	—	236	0
is	4,476	4,476			372	16	819	3,288

a Threatened is a subset of Miles Fully Supporting.
s reported.

Source: 1988 State Section 305(b) reports.

ment methodologies. Fish consumption restrictions are in place for one or more species throughout near-shore waters of the Great Lakes; as a result, Michigan, which has portions of four Great Lakes in its jurisdiction totaling 3,288 shoreline miles, reported all of its lake shore miles as not supporting uses. Other States have classified waters with restrictions as partially (or even fully) supporting designated uses.

It should also be noted that it is the nearshore waters of the Great Lakes that are most likely to be degraded; Table 8-1 does not address water quality conditions in the deeper, cleaner, less stressed central waters of the Lakes.



ake State Section 305(b) reports.

Miles Designated Use Support in Assessed Great Lakes

Causes and Sources of Impairment

Priority organics are by far the most extensive cause (i.e., specific pollutant or process) responsible for use impairment in the Great Lakes, according to the four States reporting (see Table 3-2). While all States reported Great Lakes waters affected by priority organics, New York alone accounts for over 60 percent of those waters. Metals are also

Table 3-2. Impaired Great Lakes Shoreline Miles Affected by

State	Total Impaired Waters[a]	Priority Organics		Metals	
		Major	Mod/Min	Major	Mod/Min
Illinois	63	63	—	—	—
Indiana	43	—	43	—	—
New York	477	463	—	—	—
Ohio	236	4	188	88	129
Totals	819	530	231	88	129
Combined Totals			761		215

commonly reported, with nutrients, organic enrichment/low dissolved oxygen, and pesticides also cited as contributors to use impairment.

Three States provided information on the various sources of pollution in their Great Lakes shoreline miles (see Table 3-3). Land disposal is cited as the leading source of impairment; however, all waters reportedly affected by land disposal are in one State (New York). Source and cause data on the Great Lakes are limited and are probably not indicative of the lake system as a whole.

Attainment of Clean Water Act Goals

Five States provided information on the degree to which their Great Lakes shoreline waters meet the fishable and swimmable goals of the Clean Water Act (see Table 3-4).

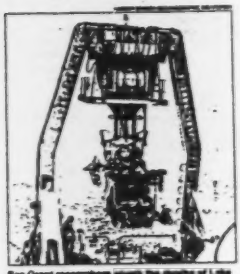
A total of 1,191 shoreline miles were assessed for fishability. Largely because of fish consumption advisories and bans, only 32 percent of these assessed waters are meeting the fishable goal. The main reason for these fishing restrictions is contamination of sediments by toxic chemicals such as priority organics that are, in turn, passed along to macroinvertebrates and fish. In none of the assessed Great Lakes shoreline miles is the fishable goal considered not attainable by State standards (see Figure 3-2). Variations in State definitions of fishable goal attainment clearly account for inconsistencies in these statistics.

Somewhat fewer shoreline miles (918) were assessed for the swimmable goal. A striking reversal is evident for the swimmable goal: 98 percent of assessed shoreline miles meet the goal, and only 2 percent do not. Again, in none of the assessed miles is the swimmable goal of the Clean Water Act considered not attainable.

s of Pollution

rients	Organic Enrichment		Pesticides		pH		Pathogens		Siltation	
Mod/Min	Major	Mod/Min	Major	Mod/Min	Major	Mod/Min	Major	Mod/Min	Major	Mod/Min
28	—	—	—	—	—	—	—	—	—	—
—	—	—	—	43	—	—	—	—	—	—
—	—	15	—	—	—	—	—	16	—	14
4	—	46	—	—	—	35	—	—	—	—
30	0	61	0	43	0	35	0	16	0	14
78		61		43		35		16		14

Unraveling the PCB Riddle



Sea Grant researchers plumb the depths of Lake Superior in the Johnson Sea Link II sub.

A voyage to the bottom of the inland sea gives researchers an in-depth understanding of PCB pollution

Annette M. Larson

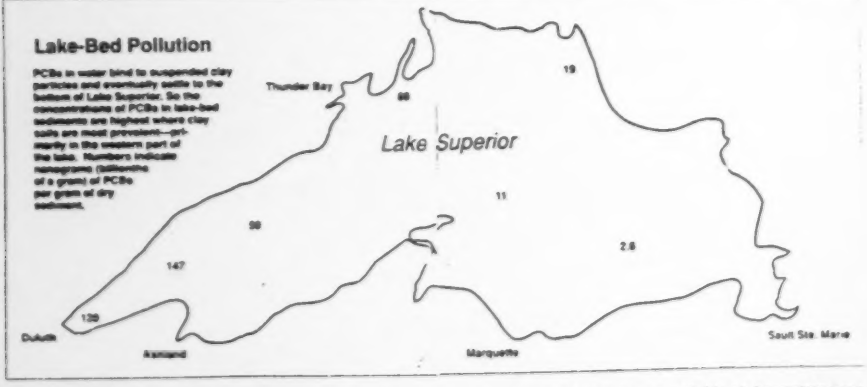
KEYS TO UNDERSTANDING the pollution of the environment may lie in our lakes—the bottom of the lakes, to be precise.

By studying the bottom of Lake Superior, Minnesota Sea Grant researchers at the University of Minnesota have challenged assumptions about pollution caused by polychlorinated biphenyls (PCBs). And the research may suggest new strategies for battling PCB pollution of our waters.

PCB Pollution

Lake-Bed Pollution

PCBs in water bind to suspended clay particles and eventually settle to the bottom of Lake Superior. So the concentrations of PCBs in lake-bed sediments are highest where clay soils are most prevalent—primarily in the western part of the lake. Numbers indicate nanograms (billionths of a gram) of PCBs per gram of dry sediment.



Prior to being banned in 1979, PCBs were used in many industrial processes and products, such as transformers, dyes, and printing inks. PCBs cause cancer in laboratory animals and are linked to behavioral problems in humans. They are among the most persistent, long-lasting chemicals ever produced.

For the past three summers, researchers Steven Eisenreich and Joel Baker plunged into the depths of Lake Superior in the Johnson Sea Link II research submersible. They collected samples of bottom sediment and particles in the water with techniques never used before in deep lake research. As a result, they made new discoveries about PCBs and other contaminants in Lake Superior.

Their current research depends on an understanding of how fish, organisms, bacteria, and toxins interact in the lake. Eisenreich and Baker are most interested in the "benthic nepheloid layer," the thin zone at the bottom of the lake in which sometimes [illegible] because of suspended sediments.

For decades, scientists have assumed that contaminants sink to the bottom of the lake, are buried, and thus are permanently removed from the ecosystem. According to Eisenreich, PCBs sometimes do settle to the bottom, attaching to suspended particles, but [illegible] small organisms [illegible] products from [illegible]

Annette M. Larson is senior information representative, Minnesota Sea Grant, University of Minnesota, St. Paul. Her most recent article for the Update was "Crayfish, Minnesota's New Cash Crop," in the March–April 1990 issue.

Resting in bottom sediments—some more than 1,000 feet beneath the surface—burbot, or "eelpout," concentrate PCBs.

waste is eaten by bacteria, which break down the particles and release PCBs. Other particles get buried, removing the contaminants from circulation.

The two researchers, however, had a few surprises when they first saw the lake's bottom. Before the dive, no one knew of the large number of hydra, zooplankton, sculpins, burbot, and lake trout in the chilly darkness 600 to 1,300 feet below the surface.

Recycling PCBs. During the dives, the researchers watched burbot (also known as eelpout or lawyers) digging trenches a few yards long on the bottom, resuspending PCB-contaminated particles in the process. The fish also dig into clay embankments, possibly to build nests.

Sculpins—fish with a large flattened head and prominent spines—"scurried all over the bottom of the lake, stirring up sediments and feeding on organisms that live in the sediment," said Eisenreich.

"The abundance and variety of life we found have incredible implications for recycling nutrients and pollutants throughout the lake," Eisenreich said. "These organisms have the ability to move materials, like PCBs and other pollutants, trapped in the bottom sediments back into circulation in the water and ultimately into fish."

Layers of bottom sediments can be read like rings on a tree. So core samples of sediments provide a history of when different chemicals were used. Even though PCBs have been banned, researchers estimate that Lake Superior contains about 20,000 kilograms (22 tons) of the contaminant. Of the 1.4 billion pounds of PCBs produced in the United States, about half has been released in the environment.

PCB levels are different in each of the Great Lakes. PCBs enter lakes from the air. The amount varies, depending on wind patterns and the lake's surface area. Contaminated rivers and industries also add PCBs to the Great Lakes.

Lake Superior has fewer industries along its shores and has not suffered as much pollution as other Great Lakes. Consequently, in Lake Superior, up to 90 percent of PCBs come from the atmosphere. The rest comes from shoreline erosion, river flow, storms, and resuspension from dredging, ship traffic, and waves, according to Eisenreich.

Once having entered lake water, PCBs may escape in several ways. As mentioned, a PCB molecule may bind to a suspended particle and sink to the bottom. Or it may be flushed out of the lake as water moves through the basin and flows downstream. Or the molecule may escape through "volatilization," a process similar to evaporation, in which PCB molecules escape directly into the air.

Residence Time. Researchers once thought PCBs took three to nine years to leave the lake. But now, Eisenreich and Baker have reduced this estimate to one to five years. The residence time of any contaminant depends on how much of the chemical is in the water, how large the lake is, how much water flows through the lake in a given time, and how efficiently the chemical attaches to particles and sinks to the bottom.

Shallow lakes with large rivers flowing out of them have a faster exchange of water than deep lakes, and lose pollutants more quickly. For that reason, a PCB molecule in Lake Erie, which is only 210 feet deep, remains in the lake an average of only 2.2 days, according to Eisenreich.

Not only do PCB levels vary from lake to lake, but different places in one lake may have different levels. Sampling of Lake Superior's waters revealed several surprises. PCB levels are lower near many urban and industrial areas and higher in unpopulated and remote areas—just the opposite of what they expected.

The reason: The western end of the lake near Duluth experiences a lot of shoreline erosion. PCBs attach to clay, the main ingredient of eroded soil. The clay sinks, taking the PCBs down in the sediment and out of the lake's water. Water in the Duluth-Superior harbor, however, contains higher levels of PCBs because ships churn up the bottom, resuspending the toxins.

High PCB levels near Isle Royale and in fish on the island's lakes were also found, despite the island's remote location. The wind may blow airborne PCBs in from the industrialized area of Thunder Bay, Baker said, although no one has documented this.

"There are high levels of many toxic contaminants in these supposed virgin areas," he said. "It's hard to quantify sources because there are so many variables," including wind direction, rain and snowfall, and the direction storms come from.

Historically, PCBs have entered the lake from rain and snowfall, spring river runoff, and erosion of contaminated shoreline soil, according to Eisenreich. More PCBs enter the lake in spring than at other times of year because of winter runoff, and from ice and snow melting on the lake.

Summer storms also carry PCBs to the Great Lakes, according to Baker. Most summer weather comes from the Gulf of Mexico or from the western United States. These storms sys-

tems pass over industrial areas, picking up contaminants and PCBs as they go. Storms coming from the north, as most winter storms do, don't pass over as many urban areas, so they accumulate fewer contaminants.

Measuring the movement of PCBs into or out of water is harder to do in the field than in a controlled laboratory environment, Baker said, because movement varies with water temperature, waves, wind, precipitation, and boat traffic.

When there are more PCBs in the water than in the air, the PCB-bearing particles tend to move to areas of lower concentration. Lower levels of PCBs in the atmosphere mean some PCBs are leaving the lake, Baker said. "Some now say the Great Lakes may actually be a source of PCBs to the air."

Lake Superior is ideal for the study of contaminants because it is large and few large rivers flow into or out of it, said Baker. This makes Superior a simpler ecosystem to study and allows the lake to serve as a scientific control for studies of other Great Lakes.

The lake serves as a "test tube" for studying processes in the environment since the natural conditions of a lake are impossible to duplicate in a lab, Baker said. "We want to understand Lakes well enough to construct models for predicting into the future," Baker said. "What effects will contaminants have? How long until lakes recover? Pollutants' movements in a lake help us understand more complex ecosystems," such as the distribution of contaminants in the atmosphere.

"Our studies are applicable to research worldwide, including how pollutants travel in weather systems," said Baker. The presence of PCBs in Antarctic ice shows that contaminants travel long distances.

Findings from the Lake Superior research may be used to make environmentally important decisions on other lakes. For instance, dredging the Waukegan harbor, north of Chicago on Lake Michigan, has been suggested to remove PCB-contaminated sediment. Sea Grant research shows that dredging would actually mix the toxic compounds back into the water, causing more pollution. It would be more damaging to dredge than to let the sediments remain at the bottom of the harbor, Baker said.

There is a lot left to learn about contaminants in the lake. Research from this past summer's dive will focus on how quickly sediments break down and release PCBs. Eisenreich, who has been investigating PCBs in Lake Superior for more than 10 years, hopes to estimate how much of the PCB load is released and recirculated in the lake.

There is also much yet to learn about Lake Superior. "There is a large discrepancy between the toxic effects of chemicals in a lab versus in the field," Baker said. This every piece of information adds to a more complete understanding of the environment and the effects humans have on it. Said Baker, "Every time we count on the lake we find new things." ▲

**STATEMENT OF KENNETH S. KAMLET,
ON BEHALF OF THE NATIONAL ACADEMY
OF SCIENCES MARINE BOARD, AT HEARING ON
SEDIMENT QUALITY ISSUES
BEFORE THE SUBCOMMITTEE ON
WATER RESOURCES
OF THE COMMITTEE ON PUBLIC WORKS
AND TRANSPORTATION, HOUSE OF REPRESENTATIVES
(MAY 15, 1990)**

Mr. Chairman and Subcommittee Members:

My name is Kenneth S. Kamlet. I am pleased to appear this morning in my capacity as Chairman of the Committee on Contaminated Marine Sediments of the National Academy of Sciences Marine Board. I am here to discuss the findings and recommendations of our Committee's recently published report entitled Contaminated Marine Sediments--Assessment and Remediation.

The Marine Board is an arm of the Commission on Engineering and Technical Systems of the National Research Council--the principal operating agency of both the National Academy of Sciences and the National Academy of Engineering in providing services to the government, the public, and the scientific and engineering communities.

I am also a Principal in the Environmental, Health & Safety practice of the management consulting firm of A.T. Kearney, based in Alexandria, Virginia. Kearney is one of the world's first and leading international management

consulting firms, with 30 offices and over 1,000 employees in 26 cities worldwide.

Background of the Marine Board Project

The members of the Marine Board's Committee on Contaminated Marine Sediments, like those of all National Academy panels, were volunteers, chosen for their special competences and with regard for appropriate balance. The nine members of the Committee, and their affiliations and areas of expertise, are listed in Exhibit 1. They included five members from academic or research institutions, and representatives of industry, environmental groups, State regulatory agencies, and the consulting community.

The Committee was assisted in its work by Liaison Representatives from at least five Federal agencies (EPA, the U.S. Army Corps of Engineers, NOAA, the U.S. Navy, and the U.S. Fish and Wildlife Service). These agencies and their representatives are listed in Exhibit 2.

The Committee's charge was as follows:

"The Committee will appraise strategies and technologies for cleaning up and managing contaminated marine sediments. It will:

- o determine the extent of contamination and its significance;
- o review the state-of-the-art of technology for cleanup and remediation;
- o identify and appraise alternate management strategies (including removal of sediments by dredging for management off-site, confining, capping or stabilizing sediments in place, and no remedial action coupled with regulation of activities at or near the site); and
- o identify R&D needs and issues for subsequent technical assessment."

The Committee's report is the product of a two-and-one-half day symposium and workshop held in Tampa, Florida (May 31-June 3, 1988), with 75 invited speakers and participants. The Committee also met three times.

Extent and Significance of Contaminated Marine Sediments

Our Committee found that contaminated sediments are widespread throughout U.S. coastal waters as a result of the intentional or unintentional use of these waters for waste disposal, with such contamination having been documented in at least 63 marine or estuarine waterways.

We found that the problem is potentially far-reaching in its environmental and public health significance; that it provides cause for concern regarding persistent bioaccumulative chemicals contaminating seafood; that reproductive impairments and other sublethal effects require increased attention; but that the extent of risk that is posed is unknown.

We also found, however, that there are inadequate data to comprehensively pinpoint or prioritize candidates for remedial action and that there are no generally accepted definitions of "contamination" which trigger consideration of remedial action.

Our Committee concluded that a "how clean is clean" standard is clearly needed, both for defining cleanup targets and for setting priorities. We recommended that

the Federal government initiate a comprehensive national program to delineate areas with contaminated sediment. However, we were concerned that remedial action not be delayed at sites of known contamination as delineation, prioritization, and standard-setting proceed.

The Committee found that no one agency has assumed responsibility for establishing a national inventory of sites with contaminated marine sediments. The Committee recommended, as a minimum step, the establishment of an Interagency Technical Committee to evaluate existing and emerging data on sediment contamination. This Committee would serve to focus limited resources on the most needed research and monitoring, reduce redundancy, and eliminate improper uses of data.

The Committee also felt that an improved Hazard Ranking System under Superfund--one which explicitly addresses contamination of foodchain species--would enhance the possibility of identifying and dealing with contaminated sediment problems under the Superfund program.

State of the Art of Technology for Cleanup and Remediation

Our Committee concluded that "existing technology for sediment cleanup and remediation is adequate in most situations." But we found that several factors have tended to constrain the accomplishment of effective clean-ups.

Thus, we found that "the time required for EPA to make a clean-up decision was more often a limiting factor in accomplishing effective clean-up than any constraints imposed by limitations in clean-up science or technology." We identified a number of ways to reduce such time delays.

The only one I'll mention here is:

- o taking advantage, where possible, of the opportunity to "piggyback" remedial actions on existing navigational dredging activities.

Another constraint has sometimes been the difficulty of obtaining certain specialized dredging equipment in the United States.

A third potential constraint relates to capping. We found that "capping" of contaminated sediments with clean material is a useful and appropriate remedial technology in many cases, but that use of this technology could probably be facilitated if it were given "preferred treatment" status under Section 121(b) of the Superfund law.

Alternative Management Strategies

On the subject of remediation strategies, the Committee found that no-action, management in-place, excavation for off-site management, or even thermal treatment, stabilization/solidification, or biological or chemical treatment are all viable management strategies in particular circumstances.

However, although as many as 13% of EPA's Superfund National Priorities List (NPL) sites may be located adjacent to coastal areas and may involve coastal sediments, no remedial action has been selected to date for the great majority of these sites. Shortcomings in the Hazard Ranking System used to designate sites for inclusion on the NPL have probably accounted for the lack of a greater number of contaminated sediment sites on the

List, as well as for the lack of greater remediation priority. Whether recent improvements in the Hazard Ranking System will resolve these problems, remains to be seen.

The Committee also recommended that additional evaluations be conducted of the applicability of Corps of Engineers' dredged material management strategies to more severely contaminated sediments.

Finally, the Committee pointed out two important distinctions between sediment contamination problems and most hazardous waste problems in upland environments:

- First, sediment contamination problems tend to involve larger volumes of somewhat less contaminated material; and

- Second, large-scale remedial technologies, extensive pre-remediation studies, and costly treatment or destruction technologies probably have limited application to most contaminated sediment sites.

In other words, it is even more important that we employ cost-effective management and cleanup strategies in the context of coastal sediment contamination than for the typical contamination problem in an upland environment.

Conclusions

The main conclusions coming out of the report of the Marine Board Committee can be summarized in four points:

1. There's a problem.

2. It's widespread and significant, but poorly quantified.

3. It has aspects that are distinct from those at upland Superfund sites. And

4. It requires systematic attention.

Thank you.

1733k

EXHIBIT 1

Committee Membership

- **Kenneth S. Kamlet**, Chairman, A.T. Kearney, Inc.
  - Contaminated sediment and marine pollution law and policy
- **William J. Adams**, Monsanto Company
  - Aquatic toxicology, alternative biological waste treatment technologies
- **A. Karim Ahmed**, Natural Resources Defense Council, Inc./Environ Corp.
  - Toxicology, public health risk assessment
- **Henry J. Bokuniewicz**, State University of New York at Stony Brook
  - Sediment transport and deposition, subaqueous capping
- **Thomas A. Grigalunas**, University of Rhode Island
  - Natural resource economics
- **John B. Herbich**, Texas A&M University
  - Dredging technology, coastal and ocean engineering
- **Robert J. Huggett**, Virginia Institute of Marine Science
  - Fate and effects of toxic chemicals in aquatic systems
- **Howard L. Sanders**, Woods Hole Oceanographic Institution
  - Benthic ecology
- **James M. Thornton**, State of Washington Department of Ecology
  - Contaminated sediment policy and planning

EXHIBIT 2

Liaison Representatives

- **Environmental Protection Agency**
  - Kim Devonald, OMEP
  - Christopher H. Zarba, OWRS
  - John Cunningham, OERR
  - Reginald Rogers, Region IV

- **U.S. Army Corps of Engineers**
  - Norman R. Francingues, WES
  - David B. Mathis, CECW-D (Dredging Division)

- **National Oceanic and Atmospheric Administration**
  - Andrew Robertson, Ocean Assessments Division

- **U.S. Navy**
  - Robert R. Bersson, NAV FAC

- **U.S. Fish and Wildlife Service**
  - John Rogers

- **U.S. Congress**
  - James Evans, Office of Representative Mike Lowery

STATEMENT OF
WILLIAM MATUSZESKI
ASSOCIATE ASSISTANT ADMINISTRATOR FOR WATER
U.S. ENVIRONMENTAL PROTECTION AGENCY
BEFORE THE
SUBCOMMITTEE ON WATER RESOURCES
HOUSE COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

May 15, 1990

Good Morning, Mr. Chairman and Members of the Subcommittees. I am accompanied by Elizabeth Southerland, Director of EPA's Task Force on Fish and Sediment Contamination, Craig Vogt, Director of the Marine Operations Division of the Office of Marine and Estuarine Protection and Kirk Stark of the Regulatory Activities Division of the Office of Wetlands Protection. We are pleased to be here today and we thank the Subcommittee for the opportunity to discuss Agency activities concerning contaminated sediments.

INTRODUCTION

We will address the problems associated with contaminated sediments; the current state of site inventories; the status of our effort to categorize sediments and establish sediment criteria; source controls and other measures to prevent further sediment contamination; the implications of contaminated sediments for dredging projects; and remediation of contaminated sites.

First, let me provide some perspectives on contamination of sediments. Most sediments in the U.S., including those dredged for navigation purposes, are not contaminated with toxic

materials. In fact, dredged materials can be and are used for beneficial purposes such as beach replenishment. However, the characteristics of sediments and sites vary greatly and, depending on local circumstances, toxic contaminants can be a problem. For example, unless river sediments are trapped behind dams or other structures, they generally move downstream and are often deposited in coastal areas. Thus, the concentration of man-made materials in sediments now in our rivers generally reflects ongoing releases of contaminants or relatively recent contamination. On the other hand, sediments tend to accumulate in lakes and estuaries. In such areas, we may find the results of toxic discharges going back many years, when most industrial and municipal wastes were discharged without treatment.

In recent years, we have sponsored a number of studies and site investigations to determine the extent and severity of sediment contamination. These investigations have indicated that toxic materials in the sediments at a number of locations in our Nation's waters are causing, or are likely to be causing, unacceptable risks to human health, aquatic life and wildlife. For example, laboratory and field studies have demonstrated that contaminated sediments can produce fin rot, cancerous lesions and tumors in bottom-feeding fishes and can substantially alter or eliminate fish, shellfish and benthic communities. In some areas where waterfowl and other birds come into contact with contaminated sediments, developmental defects have been observed.

Human health concerns have prompted a number of States to enact fishing restrictions and seafood consumption advisories in areas with contaminated sediments.

In late 1989, the National Academy of Sciences' Marine Board Committee on Contaminated Marine Sediments released its report on assessment and remediation of contaminated marine sediments. In its report, the NAS concluded that contaminated marine sediments are widespread throughout U.S. coastal waters and are potentially far-reaching in their environmental and public health significance. The NAS found that localized and widespread contamination has in the past resulted in significant changes to aquatic ecosystems and cited examples of fin rot and tumors in bottom-feeding fish from the New York Bight and Puget Sound. The NAS expressed concern based on studies indicating that infants born to mothers who consume large amounts of fish from PCB-contaminated areas were less developmentally mature at birth. Although, the NAS also reported that there is general consensus that seafood presents a route of transfer of contaminated sediments, the extent of risk that is posed is not known.

CONTAMINATED SEDIMENT MANAGEMENT

Many different statutes and implementing offices within EPA have a role to play in addressing the contaminated sediment problem. In order to develop an organized, coordinated Agency approach to handling this complex problem, we established two

Agencywide sediment committees in 1988, the Sediment Steering Committee and the Sediment Technical Committee. The Steering Committee is responsible for developing the overall Agency policy for contaminated sediments. It is drafting an Agencywide Sediment Management Strategy in order to coordinate the ongoing sediment activities of all EPA offices under the authority of several statutes. We expect the strategy to help us avoid redundant or conflicting efforts in:

- o guidance development,
- o program implementation,
- o technology transfer, and
- o coordination with other Agencies.

The strategy will cover our plans for scientific work, prevention (or source control) activities, remediation, and dredged material disposal. We plan to publish the strategy in the Federal Register in early 1991 after interagency coordination.

The second committee, the Sediment Technical Committee handles program coordination, development of certain technical guidance, and research planning. Both the Steering and Technical Committees are beginning to evaluate the extent and severity of the contaminated sediment problem in the United States so that we can develop appropriate source controls and focus remediation programs on high priority sites.

Inventory of Sites with Contaminated Sediments

To date, no agency has completed a comprehensive inventory of sites with contaminated sediments. In 1986, EPA analyzed the sediment data in our water quality data base, reviewed the published literature, and conducted interviews with knowledgeable individuals in approximately 50 Federal and State agencies. Based on this investigation, which is reflected in a report entitled "An Overview of Sediment Quality in the U.S.," EPA staff concluded that there are hundreds of sites with sediment pollutants at high concentrations indicating potential risk to human health and aquatic life. These sites include all types of waterbodies (streams, lakes, harbors, estuaries, wetland areas, and near- shore ocean) and are found in all regions of the country. We believe our most complete inventory of contaminated sites covers the Great Lakes. Many communities around the Great Lakes use treated lake water as their public water supply, and public fears about the potential effects of open-water dumping of dredged material rose at an early date. Also, in the early 1980s, rather comprehensive efforts were made under the U.S. - Canada Great Lakes Water Quality Agreement to identify areas with impaired water quality.

The National Oceanic and Atmospheric Administration's National Status and Trends Program has acquired sediment data from approximately 200 sites around the coasts of the U.S. However, as the National Academy of Sciences noted in its recent

report, the network is designed to detect broad trends in regional contamination and there are not enough sampling locations to use the data to set cleanup priorities or to make site-specific judgments.

The National Academy of Sciences concluded, and we certainly concur, that assessments based on available data present only a partial picture. The NAS recommended that the federal government initiate a program to delineate areas with contaminated sediment, without duplicating NOAA's status and trends network nor attempting to do detailed mapping. EPA's Sediment Committees are now considering how EPA might address this need identified by the NAS. We will consult with other Federal agencies - including NOAA and the U.S. Army Corps of Engineers so that our respective roles can be coordinated effectively.

Sediment Classification Methods

We are developing a variety of sediment classification methods to distinguish between "clean" and "contaminated" sediments. Naturally, this is a critical step in assessing, preventing, controlling and remediating contamination problems. We need consistent, scientifically valid approaches upon which there is general scientific agreement if we are to pursue these issues effectively.

A sediment quality criterion is the synthesis of the current chemical, physical and biological evidence that describes the impact of a sediment pollutant on the biota and on the quality of a receiving water. Some of the classification methods we are considering are intended to produce numerical, chemical-specific sediment criteria. Other methods produce biological criteria, which can be used to determine the toxicity or bioaccumulation potential of chemical mixtures in sediments.

In our Agencywide Sediment Management Strategy, we will address the appropriate uses of these various assessment methods. We expect that biological or chemical-specific sediment criteria will play important roles in the following activities:

- identifying the number, extent of and priorities for contaminated sites,
- establishing cleanup levels,
- measuring the effectiveness of clean-up activities,
- establishing and targeting point and non-point source control programs to protect sediment quality (public health and environmental quality),
- assessing risks of disposing of sediments at aquatic sites, and
- monitoring sediment quality.

Developing sediment criteria is a complicated process, involving difficult technical issues as well as a variety of

regulatory regimes. For example, in developing criteria we must address issues such as sediment contaminant interactions, bioavailability, and the variability of sediments in different geographic areas. For our efforts to be successful, research is needed to understand these processes and variabilities. We must also carefully explain how various criteria are to be applied under the provisions of different statutes. For scientific reasons, certain criteria will likely be more appropriate for some uses than for others. In addition, programmatic needs may vary. For example, numeric, chemical-specific criteria may be the best way to set discharge limits to prevent further sediment contamination, while overall biological assessments may be much more important for decisions regarding the disposal of dredged material.

We have made considerable progress in the development of sediment criteria. In the last year, the Sediment Technical Committee has developed a Sediment Classification Methods Compendium. This Compendium provides the first integrated analysis of 10 methods currently being considered for developing sediment criteria. This document will help EPA and the States select the methods most applicable to the decisions that must be made in site-specific situations. The Compendium is currently under review by EPA's Science Advisory Board (two of the methods have already been reviewed in detail by the SAB). Schedules for developing sediment criteria will not be available until the SAB

review is completed and we have an opportunity to evaluate the findings. In addition, as described more fully below, EPA and the U.S. Army Corps of Engineers are working together to develop testing manuals that primarily use biological assessments to make decisions on the disposal of dredged material. These efforts include a revised testing manual for ocean waters and development of a similar testing framework for freshwaters.

Consistent with EPA's current view, the National Academy of Sciences, in its 1989 report, reviewed the status of sediment criteria and found that no single method is widely accepted and that some methods may be more suited to particular situations than others. The NAS concluded that a number of approaches may be needed to evaluate the significance and extent of contamination at any given site and recommended that EPA consider a tiered approach to assessment. Under such an approach, testing would progress from easy, inexpensive but less definitive tests to more sensitive methods as needed. Our current thinking is that such a tiered approach should be very useful and appropriate in most, if not all of our sediment program activities.

Source Control and Pollution Prevention

Chemical and biological sediment criteria are likely to be used to calculate permit limits for point sources of sediment contamination. The resulting limits may be more stringent than existing permits that only protect against water column effects.

Similarly, sediment assessment methods will likely be used as one factor in developing loading targets for nonpoint sources. The Agencywide Sediment Management Strategy will address setting NPDES permit limits and nonpoint source loading targets to prevent further contamination problems. We are also reviewing measures that we could take under the Toxic Substances Control Act and the Federal Insecticide, Fungicide and Rodenticide Act to predict the sediment contamination potential of new and existing chemicals and pesticides.

The Agency is not seeking legislative changes in the Clean Water Act source control programs. We believe that we can ensure source controls through the Clean Water Act water quality standards program, and through the other statutes I have mentioned.

Dredged Material Management

Dredging of sediments and disposal of dredged material has been a common and longstanding practice, producing large volumes of dredged material each year. Dredging is necessary to maintain navigation waterways, which are vital to the Nation's economic growth and national security. In addition to the Corps of Engineers' (COEs') navigation projects, dredging is also undertaken by ports, maritime industries and other parties. Maintenance dredging of navigation channels and harbors occurs by its very nature in areas of significant net deposition, so these

areas sometimes coincide with "hot spots" of sediment contamination. Dredged material may be disposed of in a variety of ways as discussed below.

Disposal of dredged material in surface waters is regulated under either the Section 404 dredge and fill program of the Clean Water Act (CWA) or the Section 103 ocean disposal program of the Marine Protection, Research and Sanctuaries Act (MPRSA). Dredged material disposal into waters landward of the baseline of the territorial sea is regulated under Section 404 of the CWA. Disposal into waters seaward of the baseline of the territorial seas is regulated under Section 103 of the MPRSA. In general, the decision guidelines developed under Section 404(b)(1) of the CWA specify that the disposal of dredged material must not result in significant degradation of the aquatic environment, including human health and welfare considerations. Section 103 of MPRSA requires that the disposal of dredged material shall not unreasonably degrade or endanger human health, amenities, or the marine environment. There are a wide array of disposal options within these two regulatory frameworks, including unrestricted open-water disposal, restricted aquatic disposal such as capping of contaminated material with clean material, use for beneficial purposes such as beach nourishment, and placement in a confined disposal facility.

In order to provide more consistent guidance in choosing the most practicable and environmentally sound disposal for dredged material, EPA and the COE are working together on a Dredged Material Disposal Strategy Document. The management strategy document will provide a decisionmaking framework for determining the appropriate disposal option, and will outline disposal options along with the factors to be considered for each option such as environmental impacts, costs and restrictions to control such impacts. This strategy is designed such that decisions on disposal of dredged material are based on a comprehensive evaluation of all available options prior to choosing one. In addition to contamination, the strategy will address the physical impacts of dredged material disposal on aquatic resources and habitats (e.g., whether the placement of dredged material at a site might smother important biological resources such as shellfish beds and spawning grounds). This management strategy, when completed early next year, will go a long way to provide a consistent, cost-effective and environmentally protective approach to disposal of dredged materials, and will serve as a framework for overall management of dredged material in the U.S. At the same time, the decision framework will be flexible enough to allow for regionally tailored approaches due to the variability of environmental conditions among the Nation's waters.

In support of the dredged material management strategy document, we are in the process of revising our Ocean Dumping Regulations and associated testing manual pertaining to dredged material. The existing regulations and testing manual utilize bioassay-based approaches for evaluating dredged material and were last comprehensively revised in 1977. The new regulations will require use of the updated testing manual which reflects experience gained since 1977. The new manual includes state-of-the-art testing (including bioassays) to determine the toxicity and bioaccumulation potential of dredged material. The manual will incorporate a tiered approach with increasing levels of testing required based on results in each successive tier. Each tier will contain triggers to determine if the material is acceptable for ocean disposal or requires study at a higher tier.

On March 7, EPA and the COE published a notice in the Federal Register announcing that the joint EPA/COE ocean disposal testing manual was available for public review. Comments will be accepted for six months. This document will not be used to make decisions until it is revised and placed in final form based upon comments received. Sufficient lead time will be provided to allow regulators and laboratories to prepare for the new procedures.

EPA is considering using the ocean dumping testing manual to evaluate dredged material for disposal in section 404 waters that

are similar to ocean waters (e.g., in estuaries). Further, EPA and the COE are also developing a testing manual for determining the acceptability of disposal of dredged material into other waters regulated under section 404 (e.g., fresh waters). This manual will use the same testing framework developed for ocean disposal. We expect to have a draft of this manual available this year.

The revised ocean dumping testing manual will require use of much more sensitive species and will standardize the tests for toxicity. In addition, the revised manual also establishes improved, standardized bioaccumulation testing requirements. We believe that use of the new testing manual will result in a more accurate evaluation of the effects of dredged material disposal. As a result, the new procedures may require dischargers of dredged material to use more environmentally protective disposal options such as capping, submerged aquatic disposal, undersea burial or treatment. We are coordinating with the ports through the American Association of Port Authorities and other interested groups in order to come up with consistent and equitable solutions.

Another example of EPA and COE efforts to manage dredged materials is a jointly sponsored national seminar we are planning on the issues associated with long-term regional dredged material site selection and management, and the special problems of

contaminated sediment. This seminar will bring together a wide variety of interests, including the regulated community, port authorities and shipping interests, environmental groups, local and state planning agencies, other Federal agencies and the academic community. We hope to present the seminar this fall.

EPA believes that existing federal statutory authorities that affect dredged material disposal do not need to be amended. However, if any legislative changes are made, they should require application of the same environmental protection standards in both CWA and MPRSA for consistency in the protection of all aquatic environments. Changes which cause different treatment of dredged material disposal under these two laws may lead to inconsistent decisionmaking.

Remediation of Contaminated Sediments

To date, as one important response to recognized sediment contamination problems, State governments have issued fish bans, fish consumption advisories, swimming bans and water supply closings to protect human health. Of course, we would prefer to prevent and clean up our problems, but we must recognize the important work of health agencies in protecting human health while we work toward these goals.

It is also encouraging that natural recovery has occurred in some areas where the source of contamination has been controlled.

An example of this is the long-term natural recovery of kepone-contaminated sediments in the James River estuary in Virginia. Unfortunately, however, it was necessary for the State to ban fishing in the estuary during the 10-year recovery period.

If natural recovery is not expected to occur in a reasonable time, we can consider other approaches, such as *in situ* containment (or capping) of contaminated sediments. Capping has been employed at three projects in Puget Sound. At the two older projects, monitoring has found no leakage through the caps five years after their installation.

Finally, removal and disposal of contaminated sediments may sometimes be appropriate. Generally, removal and disposal has been used to maintain navigation channels but not to clean up sediments. However, the Superfund program has reached a settlement in which a private party has committed to dredge for remediation purposes as part of a comprehensive sediment remediation project in Waukegan Harbor in Lake Michigan. Engineering and design studies are underway and dredging is scheduled to begin in late 1991. At Commencement Bay in Puget Sound, a small amount of material has been dredged by a private party; the Superfund program anticipates that additional dredging will be required following implementation of source controls. In New Bedford Harbor, some PCB-contaminated sediments have been dredged in a pilot program which investigated the water column

effects of using various dredging technologies and ways to mitigate these effects. Some of these sediments were successfully treated by a solvent extraction technology developed under the Superfund Innovative Technology Evaluation (SITE) program. Finally, a private party in Ohio has begun to dredge sediments it contaminated as part of a settlement of NPDES permit violations.

The Superfund program is actively working to investigate or reduce sediment contamination at approximately 15 large sites and many smaller sites around the country. Based on a limited survey of 52 sites where ecological damage was expected to be found, EPA believes that a significant number of sites on the National Priorities List may involve contaminated sediments.

In EPA's Assessment and Remediation of Contaminated Sediments (ARCS) Program, led by our Great Lakes National Program Office, we are developing important information on sediment remediation that will be useful in marine, estuarine, and fresh waters. The ARCS program was established by the 1987 Water Quality Act and is now halfway through its five-year workplan. Pilot demonstrations of remediation technologies are scheduled for 1991. Also participating with EPA in the ARCS program are the Army Corps of Engineers, the U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, the eight Great Lakes States and various public interest groups.

This summer, EPA and Environment Canada are sponsoring a three-day workshop on bioremediation technologies that may be useful in cleaning up contaminated sediments. Progress in developing and demonstrating biological methods to reduce PCBs, PAHs and metals in sediments will be reviewed and experts will make recommendations about the potential usefulness of these technologies. EPA is also holding a workshop in June to review a broad range of innovative technologies for treating contaminated sediments, including biological and chemical treatment; extraction technologies; technologies for removing, pretreating and disposing of dredged materials; and other technologies such as immobilization, oxidation, and low temperature thermal treatment.

As part of its Work for Others Program, the U.S. Army Corps of Engineers, at New Bedford Harbor, has worked with EPA in a pilot program under EPA's Superfund authority to dredge in-place contaminated sediments outside navigation channels. EPA and the COE are now exploring the feasibility of developing an interagency Memorandum of Agreement (MOA) that would increase cooperation, assist mutual research and development efforts, and facilitate dredging of polluted sediments from the Nation's waterways.

Our Agencywide Sediment Management Strategy will begin to address the question of what a national contaminated sediment remediation program should look like. There is remediation authority in the Comprehensive Environmental Response, Compensation, and Liability Act (Superfund), the Resource Conservation and Recovery Act, the Toxic Substances Control Act and Section 115 of the Clean Water Act. The Strategy will also discuss how to focus remediation resources on high priority sites. In the meantime, our Sediment Technical Committee is preparing detailed technical guidance on how to select the most cost-effective remedial technologies for site-specific situations.

Mr. Chairman, that concludes my presentation. Thank you for your attention and the opportunity to be here today. We will be pleased to respond to any questions you may have.

Attachment 2 for
Page 42
lines 905-923

Chesapeake Bay - A Success Story in Estuarine Management

- In 1987, the Governors of the States of Maryland, Virginia, and Pennsylvania, the Mayor of the District of Columbia, and EPA Administrator Lee Thomas, signed an historic agreement committing the states, the District, and EPA to restoration and protection of the Chesapeake Bay. The 1987 Agreement was made possible by the establishment of a unique management framework that has permitted the States and the federal government to cooperatively seek solutions to environmental problems throughout the basin.

- Since the signing of the 1987 Agreement, success in the Chesapeake Bay cleanup effort has been measured and steady. The Agreement committed the states to a number of goals and objectives, including accomplishment of a 40% reduction in nitrogen and phosphorous loading to the Chesapeake by the year 2000. We are now beginning to see results.

- Phosphorous loads to the Bay have been reduced significantly through phosphate detergent bans and effective phosphate removal at POTWs. Although reduction in nitrogen loading has proven to be more difficult to accomplish, marked progress is evident. Biological nutrient removal is in place at two POTWs in Pennsylvania. In Maryland, 28 million dollars have been budgeted for nitrogen removal at 8 POTWs during the next two years. The states have recognized that the cost of nitrogen removal will be high. Even with new technology, it will cost more than $500 million, perhaps more than one billion dollars, to meet the targeted nutrient load reduction.

- Effective striped bass management is a symbol of the tremendous strides that states in the Chesapeake Basin have made to cooperatively manage living resources. Bold new management actions have resulted in the recovery of striped bass stocks in the Chesapeake. After several years of closure, the fishery will be reopened this year. The stocks are recovering because of effective management, and improved water and habitat quality in the Bay's tributaries. Aerial overflights are being used by the states for enforcement, and an additional 100 miles of the tributaries have been opened for fish passage since 1987. Thirteen fish passage projects are currently in place, and an additional 200 miles of habitat will be opened by 1992.

- Success in the Chesapeake Bay Program can be linked to a management framework that has encouraged cooperation among scientists, federal and state agency managers, politicians, businessmen, and the public.

  - The Chesapeake Executive Council (W. Reilly currently is chairman) composed of Governors from Maryland,

Virginia, Pennsylvania, the Mayor of D.C., and the EPA Administrator, oversees implementation of the 1987 Agreement.

- These individuals have shown extraordinary commitment to the Agreement and its goals, and have been a major force in forging the level of political support for the Bay's restoration.

- The Chesapeake Bay Commission, composed of State legislators from Maryland, Virginia, and Pennsylvania, was established to address issues requiring intergovernmental coordination and cooperation, and to introduce bills into their state legislatures.

- These individuals have effectively developed a Chesapeake Bay legislative agenda, and ushered bills through their state legislatures to promote protection of the Chesapeake Bay.

- Two large public education organizations have been fundamental in building public awareness and support for Chesapeake Bay issues.

- The Chesapeake Bay Foundation undertakes education, research, and advocacy activities in support of the Bay effort.

- The Alliance for the Chesapeake Bay is the education and outreach arm of the Chesapeake Bay Program. Through newsletters, conferences, meetings, and a variety of publications, the alliance has generated broad public support for protection of the Bay.

o There are three things that have worked uncommonly well to make the Chesapeake Bay Program work.

- There is strong commitment from the top political leaders of each state and district in the Bay basin.

- There is a direct connection between the Chesapeake Bay Program and the state legislatures through the Chesapeake Bay Commission.

- There is great breadth and strength to the public support for measures to protect the Chesapeake Bay.

1987 CHESAPEAKE BAY AGREEMENT

The Chesapeake Bay is a national treasure and a resource of worldwide significance. Its ecological, economic, and cultural importance are felt far beyond its waters and the communities that line its shores. Man's use and abuse of its bounty, however, together with the continued growth and development of population in its watershed, have taken a toll on the Bay system. In recent decades, the Bay has suffered serious declines in quality and productivity.

Representing the Federal government and the States which surround the Chesapeake Bay, we acknowledge our stake in the resources of the Bay and accept our share of responsibility for its current condition. We are determined that this decline will be reversed. In response, all of our jurisdictions have embarked on ambitious programs to protect our shared resource and restore it to a more productive state.

In 1980, the legislatures of Virginia and Maryland established the Chesapeake Bay Commission to coordinate interstate planning and programs from a legislative perspective. In 1985, Pennsylvania joined the Commission. And, in 1983, Virginia, Maryland, Pennsylvania, the District of Columbia, the U.S. Environmental Protection Agency, and the Chesapeake Bay Commission formally agreed to a cooperative approach to this undertaking and established specific mechanisms for its coordination. Since 1983, our joint commitment has carried us to new levels of governmental cooperation and scientific understanding. It has formed a firm base for the future success of this long-term program. The extent and complexity of our task now call for an expanded and refined agreement to guide our efforts toward the twenty-first century.

Recognizing that the Chesapeake Bay's importance transcends regional boundaries, we commit to managing the Chesapeake Bay as an integrated ecosystem and pledge our best efforts to achieve the goals in this Agreement. We propose a series of objectives that will establish a policy and institutional framework for continued cooperative efforts to restore and protect Chesapeake Bay. We further commit to specific actions to achieve those objectives. The implementation of these commitments will be reviewed annually and additional commitments developed as needed.

GOALS AND PRIORITY COMMITMENTS

This new Agreement contains Goals and Priority Commitments for Living Resources; Water Quality; Population Growth and Development; Public Information, Education and Participation; Public Access; and Governance.

The parties to this 1987 Agreement are the U.S. Environmental Protection Agency, representing the Federal government, the District of Columbia, the State of Maryland, and the Commonwealths of Pennsylvania and Virginia (hereinafter the "States"), and the Chesapeake Bay Commission. This Agreement may be amended and attachments added in the future by unanimous action of the Chesapeake Executive Council.

LIVING RESOURCES

GOAL: ***Provide for the restoration and protection of the living resources, their habitats and ecological relationships.*** The productivity, diversity and abundance of living resources are the best ultimate measures of the Chesapeake Bay's condition. These living resources are the main focus of the restoration and protection efforts. Some species of shellfish and finfish are of immense commercial and recreational value to man. Others are valuable because they are part of the vast array of plant and animal life that make up the Chesapeake Bay ecosystem on which all species depend. We recognize that the entire natural system must be healthy and productive. We will determine the essential elements of habitat and environmental quality necessary to support living resources and will see that these conditions are attained and maintained. We will also manage the harvest of and monitor population of commercially,recreationally and ecologically valuable species to ensure sustained, viable stocks. We recognize that to be successful, these actions must be carried out in an integrated and coordinated manner across the whole Bay system.

OBJECTIVES:

- Restore, enhance, protect and manage submerged aquatic vegetation.
- Protect, enhance, and restore wetlands, coastal sand dunes, forest buffers and other shoreline and riverine systems, important to water quality and habitat.
- Conserve soil resources and reduce erosion and sedimentation to protect Bay habitat.
- Maintain freshwater flow regimes necessary to sustain estuarine habitats, including, where appropriate, establishing minimum in-stream flows.
- Develop compatible Bay-wide stock assessment programs.
- Develop Bay-wide fisheries management strategies and develop complementary state programs and plans to protect and restore the finfish and shellfish stock of the Bay, especially the freshwater and estuarine spawners.
- Provide for the restoration of shellfish stocks in the Bay, especially the abundance of commercially important species.
- Restore, enhance and protect waterfowl and wildlife.

COMMITMENT:

To achieve this goal we agree:

- by *January 1988*, to develop and adopt guidelines for the protection of water quality and habitat conditions necessary to support the living resources found in the Chesapeake Bay system, and to use these guidelines in the implementation of water quality and habitat protection programs.
- *by July 1988*, to develop, adopt, and begin to implement a Bay-wide plan for the assessment of commercially, recreationally, and selected ecologically valuable species.
- *by July 1988*, to adopt a schedule for the development of Bay-wide resource management strategies for commercially, recreationally and selected ecologically valuable species.
- *by July 1989*, to develop, adopt and begin to implement Bay-wide management plans for oysters, blue crabs and American shad. Plans for other major commercially, recreationally and ecologically valuable species should be initiated by 1990.
- *by December 1988*, to develop and begin to implement a Bay-wide policy for the protection of tidal and non-tidal wetlands.
- provide for fish passage at dams, and remove stream blockages wherever necessary to restore passage for migratory fish.

WATER QUALITY

GOAL: *Reduce and control point and non-point sources of pollution to attain the water quality condition necessary to support the living resources of the Bay.* The improvement and maintenance of water quality are the single most critical elements in the overall restoration and protection of the Chesapeake Bay. Water is the medium in which all living resources of the Bay live, and their ability to survive and flourish is directly dependent on it.

To ensure the productivity of the living resources of the Bay, we must clearly establish the water quality conditions they require and must then attain and maintain those conditions. Foremost, we must improve or maintain dissolved oxygen concentrations in the Bay and its tributaries through a continued and expanded commitment to the reduction of nutrients from both point and nonpoint sources. We must do the same for toxics and conventional pollutants. To be effective, we will develop basin-wide implementation plans for the control and reduction of pollutants which are based on our best understanding (including that derived from modeling) of the Bay and its tributaries as an integrated system.

OBJECTIVES:

- Provide timely construction and maintenance of public and private sewerage facilities to assure control of pollutant discharges.
- Reduce the discharge of untreated or inadequately treated sewage into Bay waters from such sources as combined sewer overflows, leaking sewage systems, and failing septic systems.
- Evaluate and institute, where appropriate, alternative technologies for point source pollution control, such as biological nutrient removal and land application of effluent to reduce pollution loads in a cost-effective manner.
- Establish and enforce pollutant limitations to ensure compliance with water quality laws.
- Reduce the levels of nonpoint sources of pollution.
- Reduce sedimentation by strengthening enforcement of existing sediment control regulations.
- Eliminate pollution discharges from recreational boats.
- Identify and control toxic discharges to the Bay system, including metals and toxic organics, to protect water quality, aquatic resources and human health through implementation and enforcement of the states' National Pollutant Discharge Elimination System permit programs and other programs.
- Reduce chlorine discharges in critical finfish and shellfish areas.
- Minimize water pollution incidents and provide adequate response to pollutant spills.
- Manage sewage sludge, dredged spoil and hazardous wastes to protect the Bay system.
- Manage groundwater to protect the water quality of the Bay.
- Quantify the impacts and identify the sources of atmospheric inputs on the Bay system.

COMMITMENT:

To achieve this goal we agree:

- by *July 1988*, to develop, adopt, and begin implementation of a basin-wide strategy to equitably achieve by the year 2000 at least a 40 percent reduction of nitrogen and phosphorus entering the main stem of the Chesapeake Bay. The strategy should be based on agreed-upon 1985 point source loads and on nonpoint loads in an average rainfall year.
- by *December 1991*, to re-evaluate the 40 percent reduction by target based on the results of modeling, research, monitoring and other information available at that time.
- by *December 1988*, to develop, adopt, and begin implementation of a basin-wide strategy to achieve

a reduction of toxics consistent with the Water Quality Act of 1987 which will ensure protection of human health and living resources. The strategy will cover both point and nonpoint sources, monitoring protocols, enforcement and pretreatment regulations and methods for dealing with in-place toxic sediments where necessary.

- by *July 1988*, to develop and adopt a basin-wide implementation strategy for the management and control of conventional pollutants as required by the Water Quality Act of 1987, entering the Chesapeake Bay system from point and nonpoint sources.
- by *July 1988*, the Environmental Protection Agency, acting for the federal government, will develop, adopt, and begin implementation of a strategy for the control and reduction of point and nonpoint sources of nutrient, toxic, and conventional pollution from all federal facilities.

POPULATION GROWTH AND DEVELOPMENT

GOAL: ***Plan for and manage the adverse environmental effects of human population growth and land development in the Chesapeake Bay watershed.*** There is a clear correlation between population growth and associated development and environmental degradation in the Chesapeake Bay system. Enhancing, or even maintaining, the quality of the Bay while accommodating growth will frequently involve difficult decisions and restorations and will require continued and enhanced commitment to proper development standards. The States and their Federal government will assert the full measure of their authority to mitigate the potential adverse effects of continued growth.

Local jurisdictions have been delegated by authority over many decisions regarding growth and development which have both direct and indirect effects on the Chesapeake Bay system and its living resources. The role of local governments in the restoration and protection efforts will be given proper recognition and support through State and Federal resources.

States will engage in an active partnership with local governments to establish policy guidelines to manage growth and development.

OBJECTIVES:

- Designate a state-level office responsible for ensuring consistency with this Agreement among the agencies responsible for comprehensive oversight of development activity, including infrastructure planning, capital budgets, land preservation, and waste management activities.
- Provide local governments with financial and technical assistance to continue and expand their management efforts.
- Consult with local government representatives in the development of Chesapeake Bay restoration and protection plans and programs.
- Identify and give public recognition to innovative and otherwise noteworthy examples of local government restoration and protection-related programs.
- Assure that government development projects meet all environmental requirements.
- Promote, among local, state, and federal governments, and the private sector, the use of innovative techniques to avoid and, where necessary, mitigate the adverse impacts of growth.

COMMITMENT:

To achieve this goal, we agree:

- to commission a panel of experts to report by December 1988, on anticipated population growth and land development patterns in the Bay region through the year 2020, the infrastructure requirements necessary to serve growth and development, environmental programs needed to improve Bay resources while accommodating growth, alternative means of managing and directing growth, and alternative mechanisms for financing governmental services and environmental controls. The panel of experts will consist of twelve members: three each from Virginia, Maryland, and Pennsylvania, and one each from the District of Columbia, Environmental Protection Agency, and the Chesapeake Bay Commission.

- by *January 1989*, to adopt development policies and guidelines designed to reduce adverse impacts on the water quality and living resources of the Bay, including minimum best management practices for development and to cooperatively assist local governments in evaluating land-use and development decisions within their purview, consistent with the policies and guidelines.

- to evaluate state and federal development projects in light of their potential impacts on the water quality and living resources of the Chesapeake Bay, and design and carry out each State and Federal development project so as to serve as a model for the private sector in terms of land use practices

- by *December 1988*, to develop a strategy to provide incentives, technical assistance and guidance to local governments to actively encourage them to incorporate protection of tidal and non-tidal wetlands and fragile natural areas in their land-use planning, water and sewer planning, construction, and other growth-related management processes.

PUBLIC INFORMATION, EDUCATION AND PARTICIPATION

GOAL: ***Promote greater understanding among citizens about the Chesapeake Bay system, the problems facing it and policies and programs designed to help it, and to foster individual responsibility and stewardship of the Bay's resources.***

GOAL: ***Provide increased opportunities for citizens to participate in decisions and programs affecting the Bay.*** The understanding and support of the general public and interest groups are essential to sustaining the long-term commitment to the restoration and protection of the Chesapeake Bay system and its living resources. Citizens must have opportunities to learn about that system and associated management policies and programs and must be given opportunities to contribute ideas about how best to manage that natural system.

OBJECTIVES:

- Provide timely information on the progress of the restoration program.
- Assure a continued process of public input and participation in policy decisions affecting the Bay.
- Enhance Bay-oriented education opportunities to increase public awareness and understanding of the Bay system.

- Provide curricula and field experiences for students.
- Promote opportunities to involve citizens directly in Bay restoration efforts.
- Coordinate the production and distribution of Bay information and education materials.

COMMITMENT:

To achieve these goals, we agree:

- to conduct coordinated education and information programs to inform the general public, local governments, business, students, community associations, and others of their roles, responsibilities, and opportunities in the restoration and protection efforts, and to promote public involvement in the management and decision-making process.
- to provide for public review and comment on all implementation plans developed pursuant to this agreement.
- by *March 1988*, to develop state and federal communication plans for public information, education, and participation, and by *May 1988*, to develop a unified, Bay-wide communication plan.
- to promote Chesapeake Bay restoration efforts by establishing an annual Bay-wide series of Chesapeake Bay Watershed Awareness events, to include a Governors' Cup Fishing Tournament.

PUBLIC ACCESS

GOAL: ***Promote increased opportunities for public appreciation and enjoyment of the Bay and its tributaries.*** Interest in and commitment to the Chesapeake Bay and its tributaries are greatly affected by personal contact with that natural system. Consequently, improved opportunities for access to the shores and waters of the system are essential if public awareness and support are to be maintained and increased.

OBJECTIVES:

- Improve and maintain access to the Bay including public beaches, parks and forested lands.
- Improve opportunities for recreational and commercial fishing.
- Secure shoreline acreage to maintain open space and provide opportunities for passive recreation.
- Secure necessary acreage to protect unique habitat and environmentally sensitive areas.

COMMITMENT:

To achieve this goal we agree:

- to intensify our efforts to improve and expand public access opportunities being made available by the federal government, the states, and local governments, by developing a strategy, which includes an inventory of current access opportunities by *July 1988*, which targets state and federal actions to secure additional tidal shorefront acres by *December 1990* along the Bay and its tributaries.
- by *December 1988*, to prepare a comprehensive guide to access facilities and the natural resource system for the tidal Chesapeake Bay.

GOVERNANCE

GOAL: ***Support and enhance the present comprehensive, cooperative and coordinated approach toward management of the Chesapeake Bay system.***

GOAL: ***Provide for continuity of management efforts and perpetuation of commitments necessary to ensure long-term results.*** The cooperation necessary to sustain an effective Chesapeake Bay restoration and protection effort requires a formal working arrangement involving the states and the federal government. That institutional arrangement must allow for and promote voluntary individual actions coordinated within a well-defined context of the individual responsibilities and authorities of each state and the federal government. It must also ensure that actions which require a concerted, Bay-wide approach be addressed in common and without duplication. One of the principal functions of the coordinating institution is to develop strategic plans and oversee their implementation, based on advice from the public, from the scientific community, and from user groups.

In addition, the coordinating body must exert leadership to marshal public support, and it must be accountable for progress made under the terms of this agreement. The coordinating body will continue to be called the Chesapeake Executive Council. The Chesapeake Executive Council shall be comprised of the Governors, the Mayor of the District of Columbia, the Administrator of the Environmental Protection Agency, and the Chairman of the Chesapeake Bay Commission. The chairmanship of the Council shall rotate annually as determined by the Council. The term of the Chairman shall be one year. The Administrator of the Environmental Protection Agency shall represent the Federal government, and the Chairman of the Chesapeake Bay Commission shall represent its members.

OBJECTIVES:

- Continue to demonstrate strong, regional leadership by convening an annual public meeting of the Chesapeake Executive Council.
- Continue to support the Chesapeake Executive Council and provide for technical and public policy advice by maintaining strong advisory committees.
- Coordinate Bay management activities and develop and maintain effective mechanisms for accountability.
- The Chesapeake Bay Liaison Office shall provide staff support to the Chesapeake Executive Council by providing analyses and data management, and by generating reports related to the overall program. The Implementation Committee shall provide guidance to the Chesapeake Bay Liaison Office Director in all matters related to support for the Council and their supporting committees, subcommittees, and work groups including the development of all plans and other documents associated with the Council.
- Examine the feasibility of joint funding support of the Chesapeake Bay Liaison Office.
- Track and evaluate activities which may affect estuarine water quality and resources and report at least annually.
- Develop and maintain a coordinated Chesapeake Bay data management system.
- Continue to implement a coordinated Bay-wide monitoring system and develop a Bay-wide living resource monitoring system.
- Develop and implement a coordinated Bay-wide research program.

COMMITMENT:

To achieve these goals we agree:

- to develop an annual Chesapeake Bay work plan endorsed by the Chesapeake Executive Council

- to continue to support Bay-wide environmental monitoring and research to provide the technical and scientific information necessary to support management decisions.
- to strengthen the Chesapeake Bay Liaison Office by assigning as appropriate, staff persons from each jurisdiction and from participating federal agencies to assist with the technical support functions of that office.
- by *July 1988*, to develop and adopt a comprehensive research plan to be evaluated and updated annually to address the technical needs of the Chesapeake Bay Program.
- by *July 1988*, develop a Bay-wide monitoring plan for selected commercially, recreationally, and ecologically valuable species.
- by *March 1988*, to establish a local government advisory committee to the Chesapeake Executive Council and charge that committee to develop a strategy for local government participation in the Bay program.
- to consider and review the feasibility of establishing an independent Chesapeake Bay Executive Board.
- by *July 1988*, the Environmental Protection Agency, acting for the Federal government, will develop a coordinated, federal agency workplan which identifies specific federal programs to be integrated into a coordinated federal effort to support the restoration of the Chesapeake Bay.

By this Agreement, we reaffirm our commitment to restore and protect the ecological integrity, productivity, and beneficial uses of the Chesapeake Bay system. We agree to report in *January 1989 on the progress made in fulfilling the commitments in this agreement, and to consider at that time additional commitments. The implementation strategies which will be developed pursuant to this agreement will be appended as annexes, and annual reports will include an accouting of progress made on each strategy.*

December 15, 1987
(Date)

FOR THE COMMONWEALTH OF VIRGINIA

FOR THE STATE OF MARYLAND

FOR THE COMMONWEALTH OF PENNSYLVANIA

FOR THE UNITED STATES OF AMERICA

FOR THE DISTRICT OF COLUMBIA

FOR THE CHESAPEAKE BAY COMMISSION

1987 CHESAPEAKE BAY AGREEMENT

What is the new Bay agreement?

The new Bay agreement is a draft document awaiting the signatures of the governors of Maryland, Pennsylvania and Virginia, the mayor of the District of Columbia, the administrator of the federal Environmental Protection Agency and the chairman of the Chesapeake Bay Commission. It lays out a cooperative set of specific goals, objectives, commitments and time frames among the Bay jurisdictions and the federal government for restoring and protecting the Chesapeake Bay over the coming years.

Why do we need a new agreement?

The existing Chesapeake Bay agreement, signed by the above parties in December 1983, contains few details or specifics of how the Chesapeake Bay should be restored. Since that time, more reliable technical information about the Bay and the likely results of different cleanup strategies has become available. In addition, new governors have taken office in all three states, a new EPA Administrator has been appointed, and all have expressed a desire for a new agreement with more specific goals and commitments.

Who wrote the agreement?

The proposed agreement — which is slated for signing in December — was drafted at the request of Virginia Governor Gerald Baliles by members of the Chesapeake Executive Council, the multi-jurisdiction body that coordinates the Chesapeake Bay Program. The draft resulted from many calls for a more specific agreement. The draft incorporates comments made by the citizens and scientific advisory committees, who met with the Executive Council in May to initiate the process of developing a new agreement.

When will it take effect?

At present, the new Bay agreement is in draft form. When signed in December 1987, it will take effect immediately.

How is the agreement organized?

The agreement consists of a series of policy goals, objectives and commitments. It is divided into six sections: Living Resources, Population Growth and Development, Water Quality, Public Information, Education and Participation, Public Access, and Governance.

What does it mean for the Chesapeake?

The agreement sets forth 20 policy commitments that will shape the future direction of state and federal efforts to clean up the Bay over the coming years. Among these commitments are pledges to:

- develop, adopt, and begin implementation by July 1988 of a basin-wide plan to achieve a 40 percent reduction by the year 2000 of nutrients entering the Chesapeake Bay system.
- develop and adopt by December 1988 a basin-wide implementation plan for the reduction and control of toxic materials.
- adopt by July 1988 development guidelines designed to reduce adverse impacts on the water quality and living resources of the Bay.
- adopt by July 1988 a plan to control pollution from all federal facilities.
- adopt a plan for the assessment of fisheries stocks by July 1988 and to adopt a schedule for the development of fishery management plans by January 1989.

What does the agreement mean for you?

If the commitments included in the draft agreement are formally agreed to and then implemented, particularly the ones designed to protect water quality and living resources — it is likely that we will all be able to enjoy a cleaner and more productive Bay. New scientific work indicates that reducing the level of nutrients in the Bay by 40 percent will lead to significant improvements in water quality so that oysters, striped bass (or rockfish) and other organisms will have a better chance at survival.

However, the agreement also implies major new investments in programs to control point and nonpoint sources of nutrients, toxics, and other pollutants. How these programs will be financed is not specified in the draft, but ultimately everyone in the region will have to contribute to the restoration effort, and this issue will need to be addressed in the implementation plans.

Do I have a say in the future of the Bay?

Yes. The draft agreement includes commitments to provide for public review and comment on all implementation plans developed as a result of the agreement. It also pledges the states and the federal government to conduct education and information programs to inform the public about the restoration and protection effort, and to meet with and report to the public annually on the progress made in fulfilling the terms of the agreement. Commenting on the draft agreement is the best step for citizens wishing to be involved in policy decisions that will determine the future of the Bay.

What can I do?

The governors have indicated that they would like to hear public comments on the proposed Bay agreement. Over the coming months, th Advisory Committee to the Chesapeake Bay Program will be conducting a series of roundtable public meetings to discuss the agreement an which it might be improved. Also present at the roundtable meetings to hear your comments and discuss the agreement will be representative Governors' offices, EPA, the scientific community and the Chesapeake Bay Commission. You are encouraged to attend. All meetings are from 10 p.m.

Oct. 13–**Washington, D.C.**, University of District of Columbia, Van Ness Campus, Building H
Oct. 14–**Annapolis, Md.**, Department of Agriculture, Harry Truman Parkway
Oct. 15–**Lewisburg, Pa.**, Bucknell University, University Center
Oct. 19–**Richmond, Va.**, Math & Science Center, 2401 Hartman Street, Building A
Oct. 20–**Norfolk, Va.**, Old Dominion University, Portsmouth Chesapeake Room, Webb Center
Oct. 22–**Harrisburg, Pa.**, Penn State Harrisburg Campus, Student Center
Oct. 26–**Fairfax, Va.**, George Mason University, Student Union II, Rooms 5-6-7
Oct. 28–**Easton, Md.**, Easton High School, Rt. 50 & Mecklenburg Avenue
Oct. 29–**Baltimore, Md.**, Essex Community College, Community Center

The purpose of the roundtable meetings is to hear public comments, to attempt to develop a consensus about how the agreement can be im to generate initial ideas about how the agreement should be implemented. Come prepared with good ideas and an open mind!

Written comments from organizations and individuals are also welcome. Send them to:
The Honorable Gerald Baliles
Chairman, Chesapeake Executive Council
Office of the Governor
Richmond, Virginia 23219

Please send copies of your comments to all of the following people:

David Carroll
Office of Governor William Donald Schaefer
Hall of Records
Annapolis, Maryland 21401

James Grace
Office of Governor Robert P. Casey
P.O. Box 2063
Harrisburg, Pennsylvania 17120

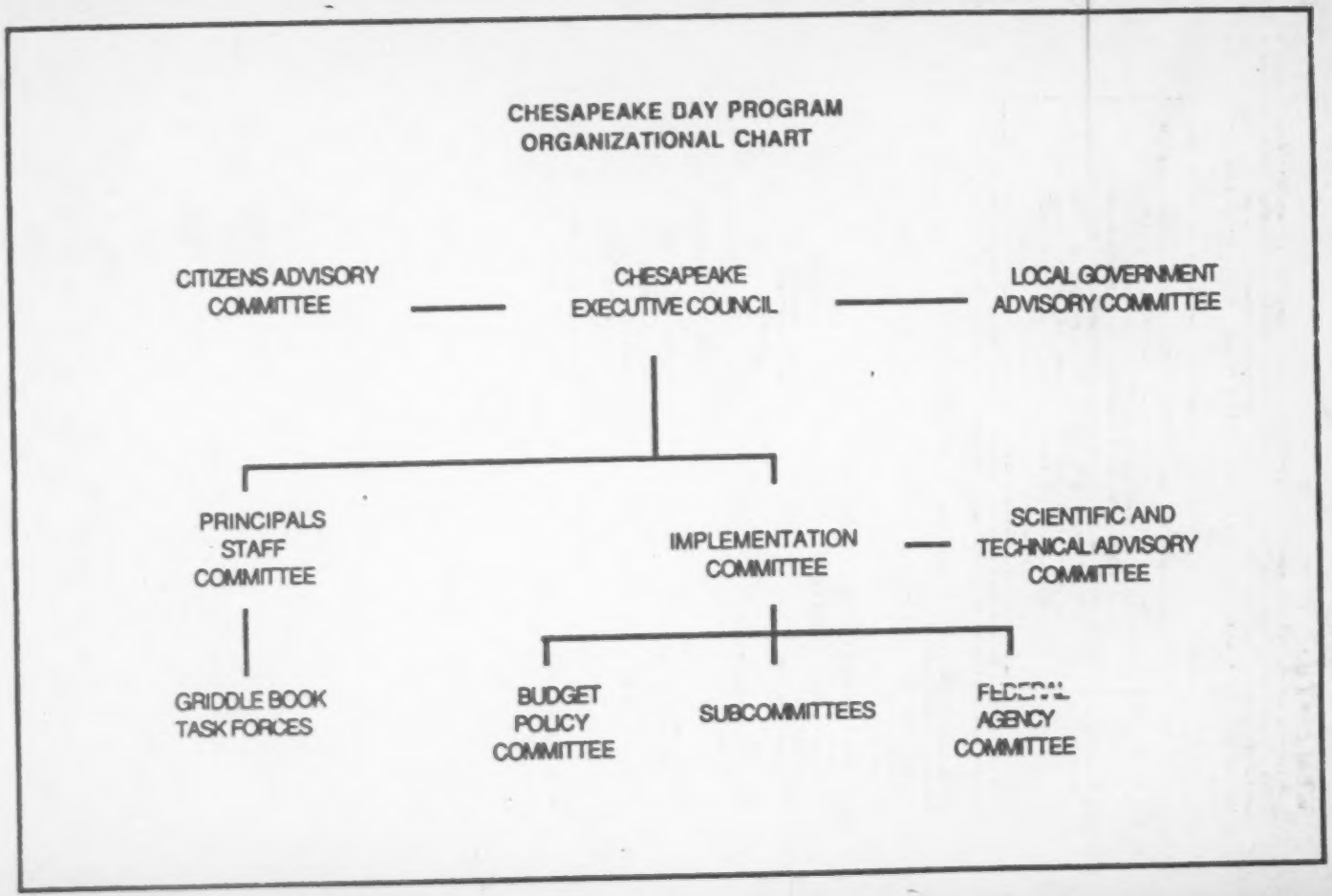
Donald Murray
Office of Mayor Marion Barry
644 "H" Street, NW., Suite 1120
Washington, D.C. 20001

James E. Seif
Regional Administrator
Environmental Protection Agency
841 Chestnut Street
Philadelphia, Pennsylvania 19107

Kenneth Cole
Chairman
Chesapeake Bay Commission
60 West Street
Annapolis, Maryland 21401

Edwina H. Coder
Chairman
Citizens Advisory Committee
156 Hamilton Road
Lancaster, Pennsylvania 17603

For more information, contact the Citizens Program for the Chesapeake Bay, 6600 York Rd., #109A, Baltimore, Md. 21212 (301) 377-62 the full text of the draft agreement are available from CPCB.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CHESAPEAKE EXECUTIVE COUNCIL
LOCAL GOVERNMENT ADVISORY COMMITTEE
PRINCIPALS STAFF COMMITTEE
IMPLEMENTATION COMMITTEE
SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE
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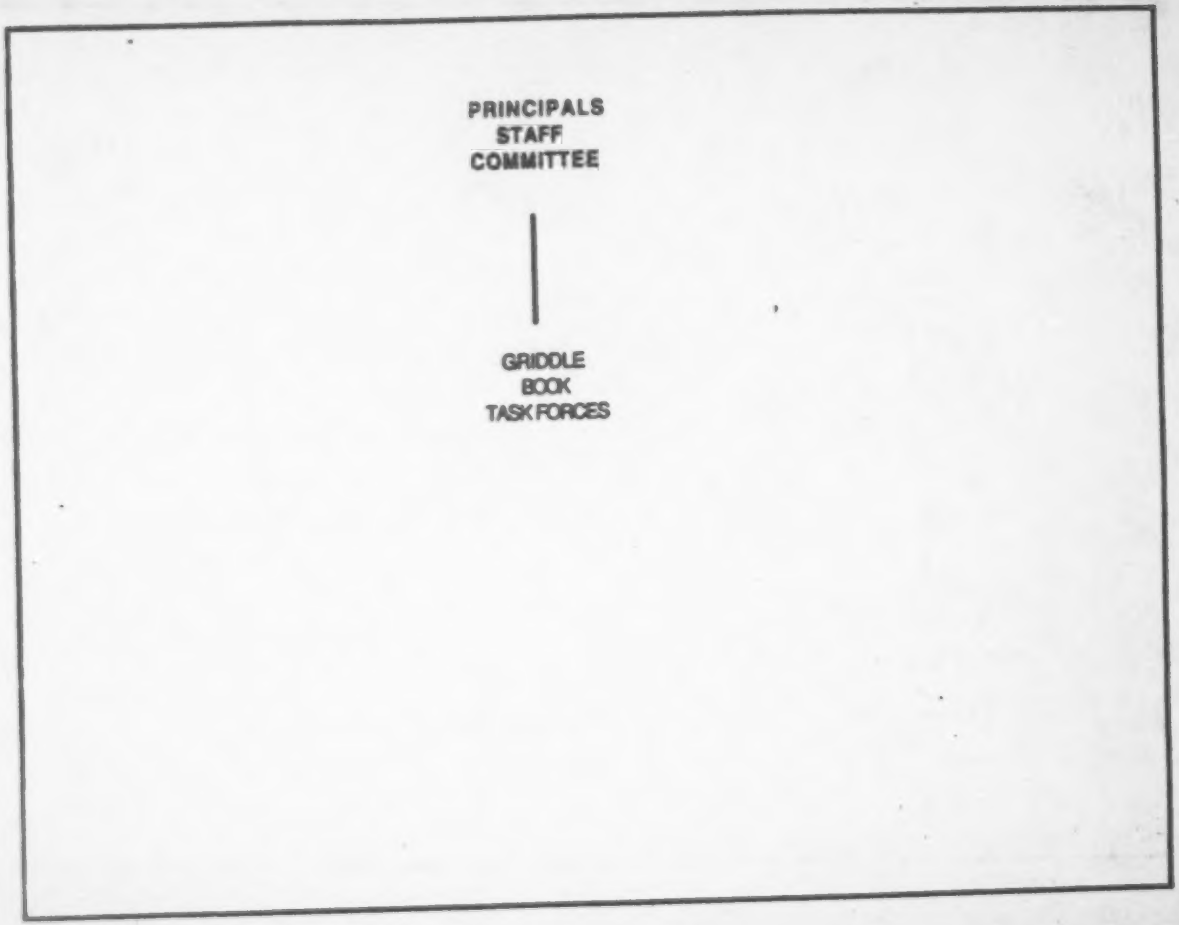
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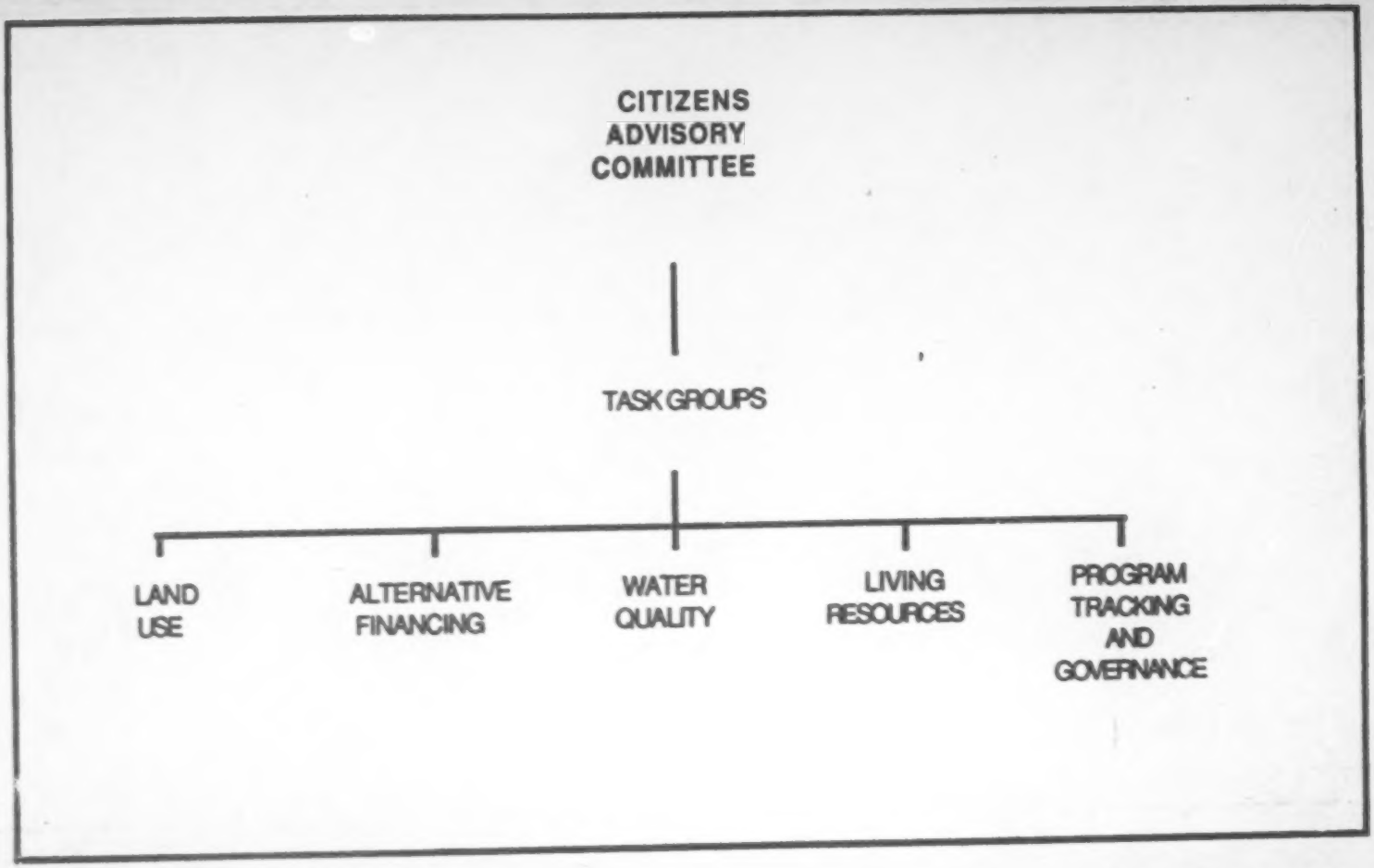
- SCIENTIFIC AND TECHNICAL ADVISORY COMMITTEE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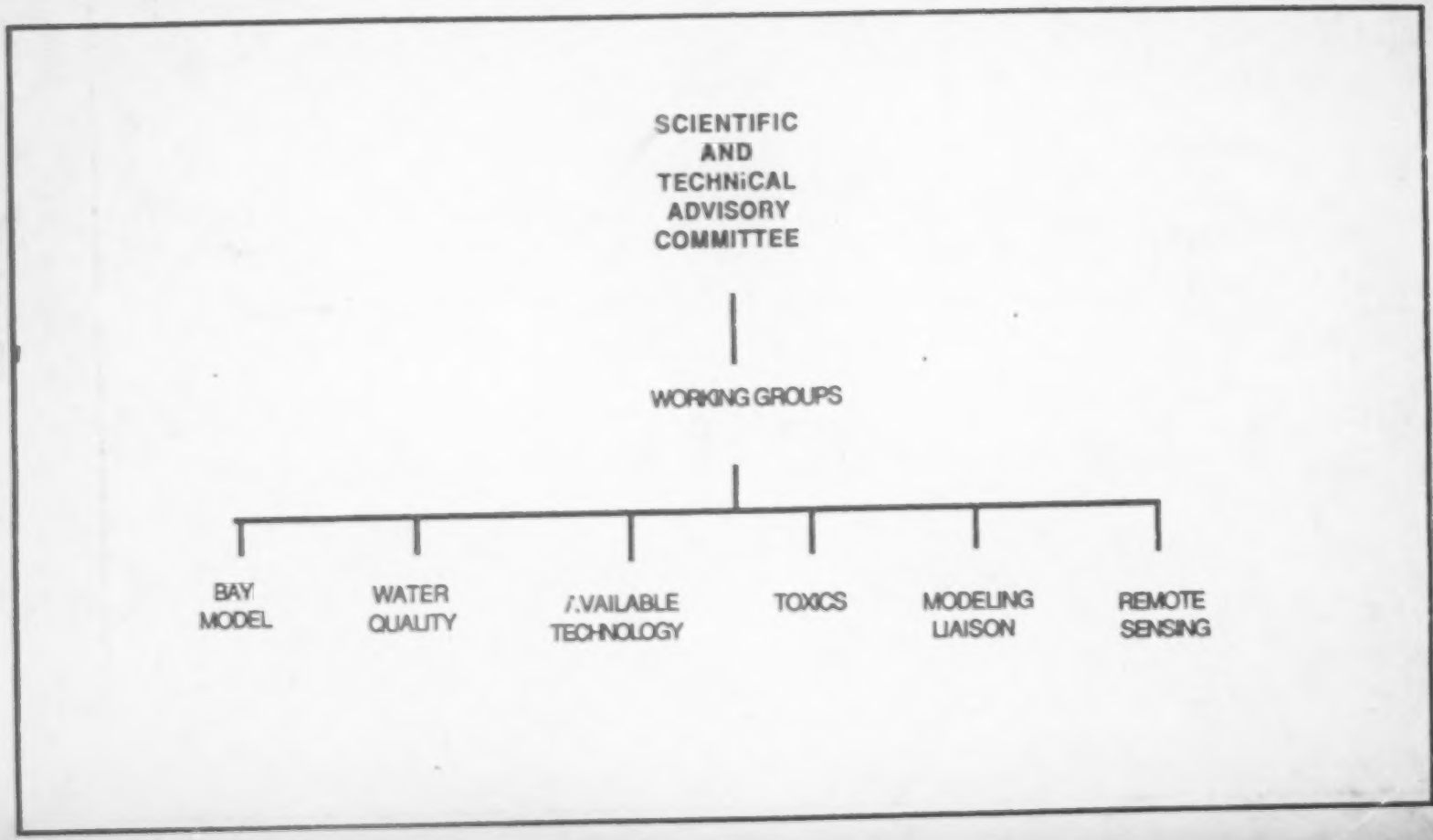
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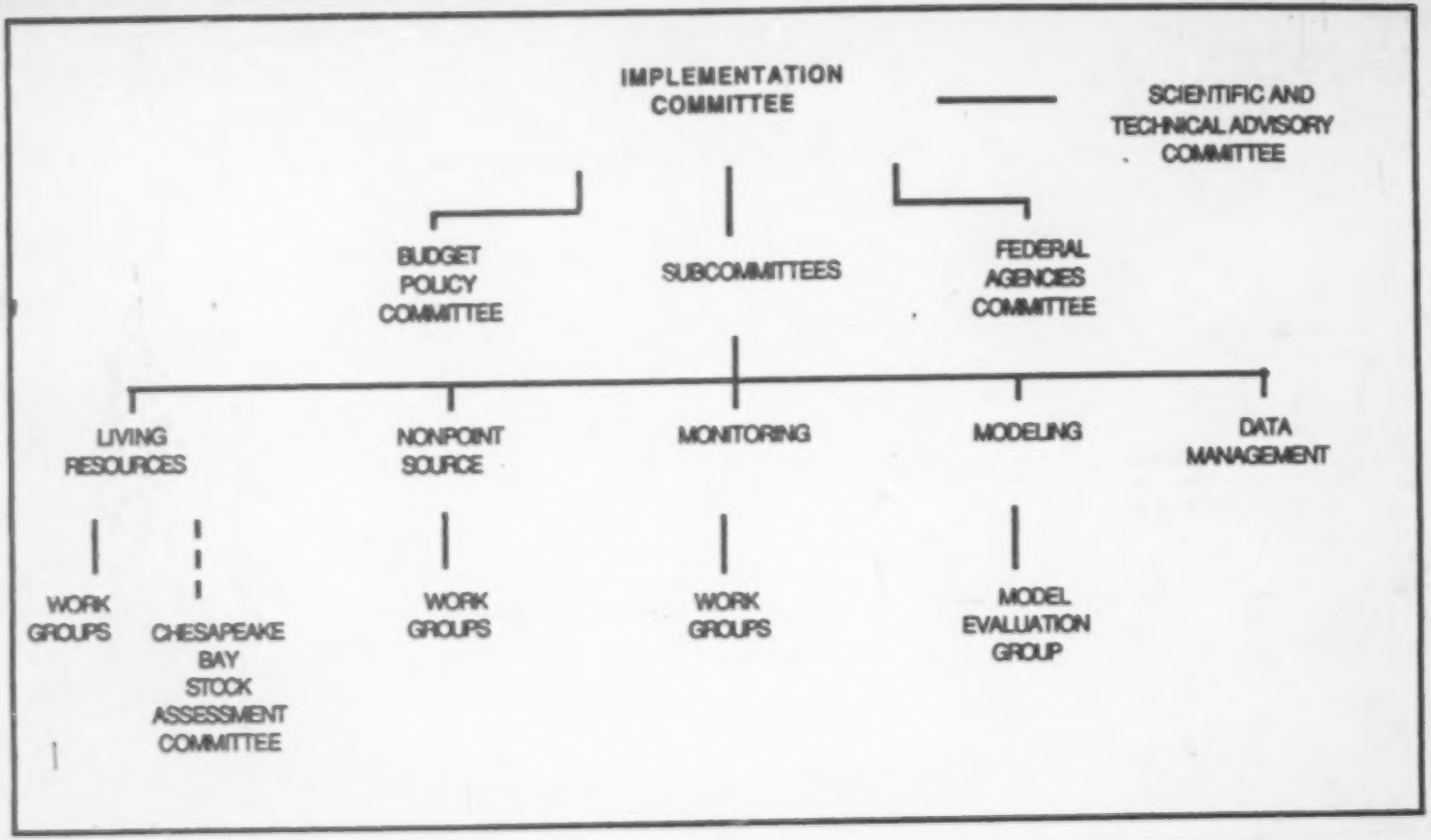
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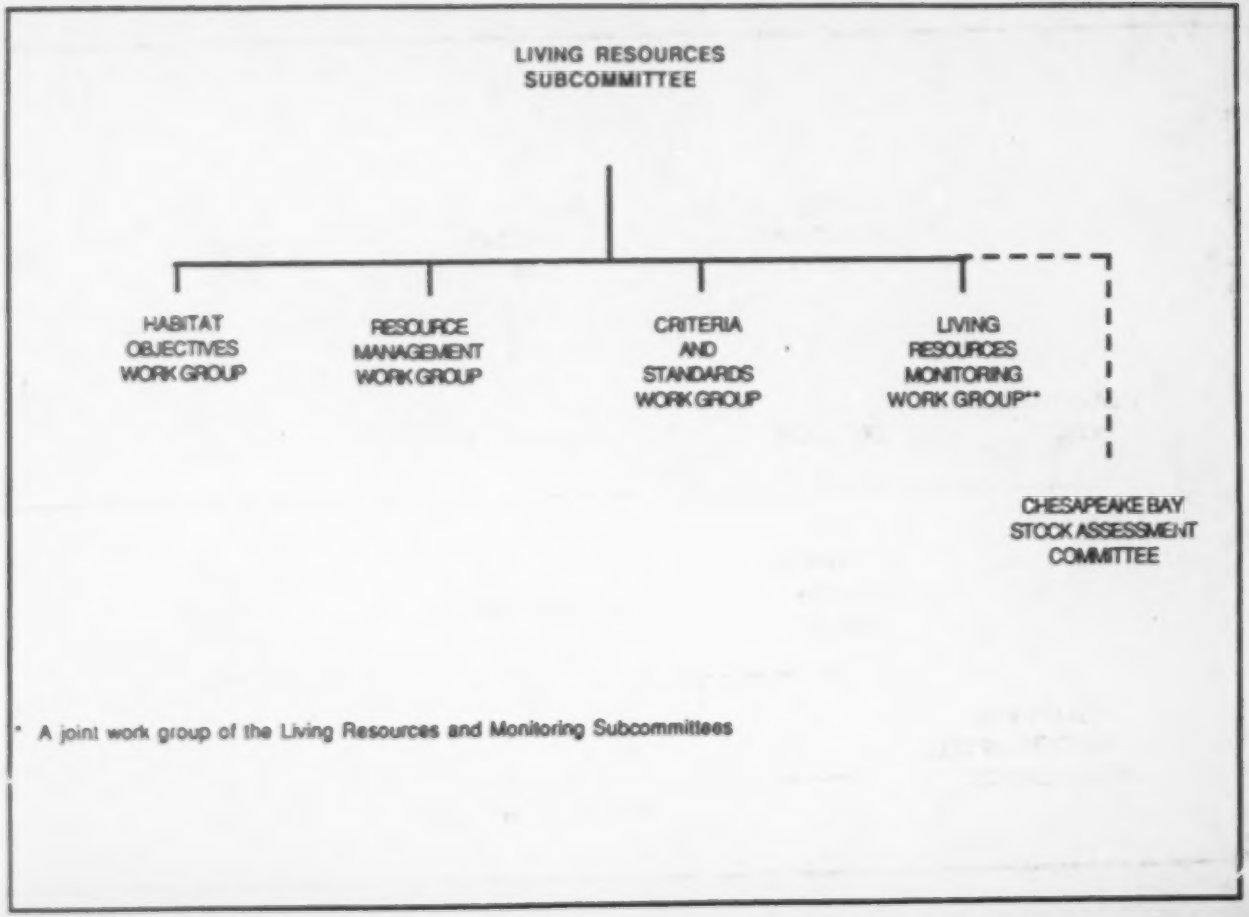
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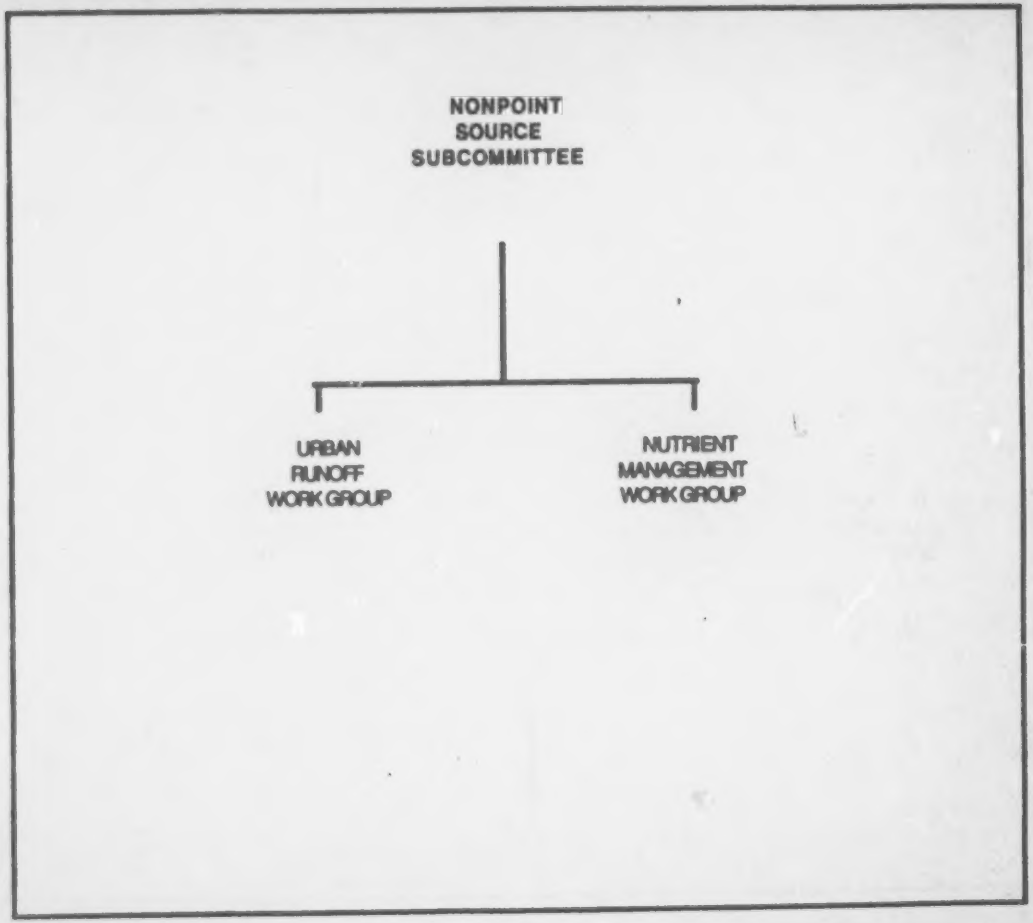
COMMITTEE
* A joint work group of the Living Resources and Monitoring Subcommittees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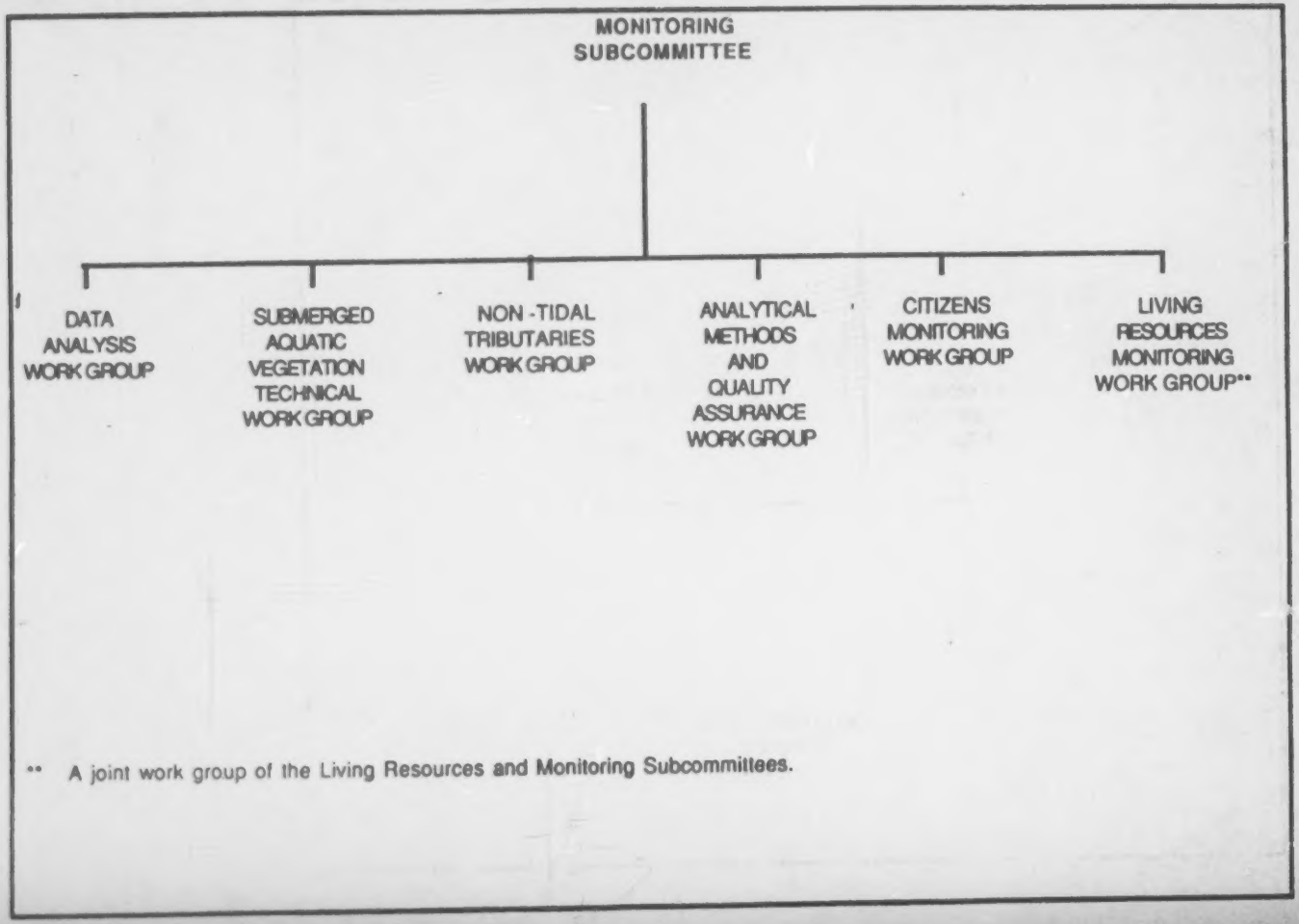
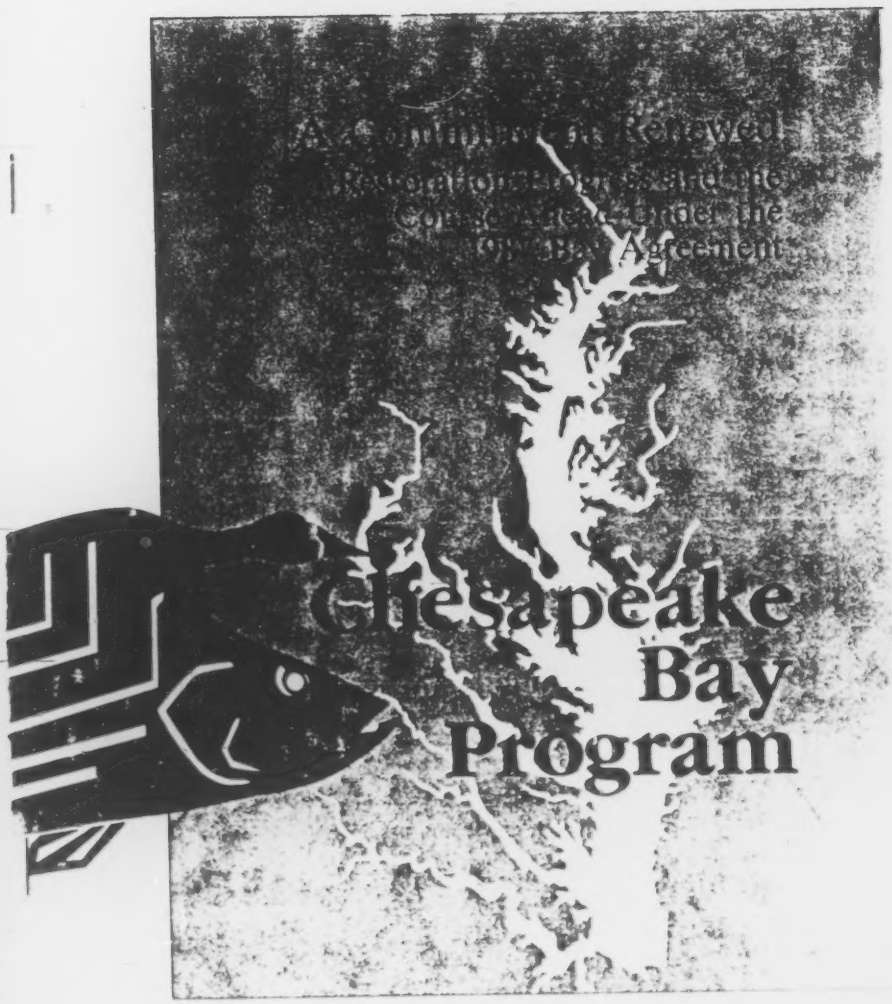


** A joint work group of the Living Resources and Monitoring Subcommittees.



February 1988

The Chesapeake Bay Program: A Commitment Renewed

Restoration Progress and the Course Ahead Under the 1987 Agreement

A Report of the
Chesapeake Implementation Committee

February 1988

For more information, contact Ray Hall, Office of Marine and Estuarine Protection, U.S. EPA, at (202) 475-6745

Table of Contents

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Preface vii

Chapter 1 - The Chesapeake Challenge 1

Population Growth 1
The 1983 Bay Agreement 4
Evolution of Goals 8
Measuring Results 12
Future Directions 13

Chapter 2 - Managing for Living Resources Goals 15

Establishing Living Resources Habitat Objectives 15
Targeting Regions for Habitat Restoration 20
Habitat Objectives for Management: An Ecosystem Approach 25
EPA Water Quality Criteria 27
Chesapeake Bay State Standards 29
Adequacy of Existing State Standards for Tidal Waters 33
Baywide Assessment and Managment of Living Resources 33
Summary 34

Chapter 3 - Approaching the Nutrients Goal 35

The Anatomy of Decline 35
Nutrient Sources and Controls 36
Point Sources 37
Nonpoint Sources 41
Projecting Future Bay Quality 44
Evaluating Reduction Alternatives 46
Attaining Reduction Goals 48
Choosing Control Options 51

Chapter 4 - Building a Strategy for Managing Toxic Pollutants 53

Research Findings 53
Existing Control of Toxic Pollutants 53
Controlling Toxicants 54
The Task Ahead 62

Chapter 5 - Research Needs 64

Modeling Capabilities 64
Living Resources Research 65
Toxic Substances 66
Economics 67
Looking Ahead 68

Appendices 69

Glossary 82

References 85

Preface

Restoration of the Chesapeake Bay's water quality and living resources will require many years of sustained effort by governments and citizens alike. The cumulative effects of decades of environmental decline and surging population growth combine to challenge the will, imagination and resources of both government agencies and private organizations.

People of the Chesapeake Basin want to know how much more must be done, where, at what cost, for how long and with what anticipated results in the Bay. To help answer these questions, the Chesapeake Executive Council in 1986 adopted a new program evaluation and development process -- the Phase II process. Since the Phase II process will evolve over the next five years or more, the Council asked for this interim report to give Bay managers, decision makers, legislators and interested members of the Bay community information they can use now to further advance state and federal cleanup activities. Those activities are described in the 1985 Chesapeake Bay Restoration and Protection Plan [1]. The annual reports under the 1983 Chesapeake Bay Agreement document the progress of these programs [2,3].

Members of the Executive Council recognized that specific goals and milestones are necessary to retain public support. In January 1987, Virginia Governor Gerald Baliles, Chairman of the Council, proposed that the adequacy of the 1983 Agreement [4] be examined and that a new Agreement be developed if necessary. In May of last year a drafting committee of Council members was formed and charged with the tasks of expanding the original Agreement to address key issues and proposing specific goals and milestones necessary to provide public accountability and retain citizen support. In August, a Draft Agreement [5] was released and a public review process launched. That process, along with information developed for this report, helped the drafting committee to revise and complete the new Bay Agreement [6], which was signed December 15, 1987.

This report summarizes current knowledge about the problems of the Bay, identifies emerging issues, and presents new information about the effectiveness of cleanup programs. It documents the findings and works performed since 1983, and explains how they led to a new, expanded Agreement. Chapter 1 outlines restoration and protection efforts, which focus on reducing the flow of nutrients and toxic substances to the Bay, and relates them to Chesapeake Bay Program goals. It also summarizes key commitments and objectives of the 1987 Chesapeake Bay Agreement. Habitat and living resources goals for the Bay and its tributaries are detailed in Chapter 2.

Alternative nutrient control strategies and their potential to achieve water quality conditions necessary to restore and protect living resources are presented and discussed in Chapter 3. Evaluations of strategies are based on projections made from computerized models and the best judgment of Bay region scientists and managers. Problems of toxic contamination and current efforts to reduce the levels of toxicants in the Bay system are outlined in Chapter 4. Possible long-term strategies to control and manage toxic pollutants also are described.

The information provided in chapters 2, 3 and 4 forms a foundation for meeting living resource commitments and formulating the nutrient reduction and toxic substance control strategies required under the 1987 Agreement.

In the course of preparing the interim report, writers and reviewers have focused on new areas where more knowledge is needed for major program decisions yet to come. These research needs, identified in Chapter 5, will be useful in developing the comprehensive research plan called for in the 1987 Agreement.

State and federal agencies are committed to consider the information presented in this report, to decide how they can most effectively and efficiently apply this information to their programs, and to use it to help meet the commitments in the 1987 Chesapeake Bay Agreement. Any resulting changes in programs will be reflected in future Chesapeake Bay Restoration and Protection Plan supplements.

Chapter 1

The Chesapeake Challenge

Though signs of the Bay's decline were evident long before the 1970s and some studies had been conducted, there had been no comprehensive attempts to gather and evaluate data for the watershed as a whole, to determine the cause and effect relationships underlying the Bay's problems, and to recommend remedies. The major environmental problems of the Chesapeake Bay and its tributaries were investigated in a comprehensive study initiated by the Environmental Protection Agency (EPA) in 1975 at the direction of Congress.

Final research findings and recommended remedial strategies were published in September 1983[7]. The study identified ten areas of environmental concern in the Bay (see box). The EPA Chesapeake Bay Program (CBP) then selected three specific problems for concentrated examination: nutrient enrichment, toxic substances, and declines in submerged aquatic vegetation (SAV).

Researchers concluded that excessive nitrogen and phosphorus in the Bay were causing the overgrowth of ecologically undesirable species of phytoplankton (microscopic floating plants). Effects of this overgrowth included increases in the extent and duration of low dissolved oxygen in the deep waters of the Bay, chiefly as a result of plankton decay processes. Adequate levels of dissolved oxygen are essential to animals and plants of the Bay.

Toxic substances are a prime concern because of their potential chronic and lethal effects on the Bay's living resources. They can accumulate in the tissues of fish and shellfish or attach to sediment, eventually recycling through the water, plants and animals in the ecosystem. Contamination in the Bay is most severe near heavily industrialized areas along the Elizabeth and Patapsco rivers. In these waters and sediments both heavy metal and toxic organic compound concentrations are found at elevated levels. Toxic contaminants are found in lower concentrations in other portions of the Bay.

The sharp decline of SAV throughout the Bay (especially in its upper reaches) created concern over the loss of habitat and indicated that the Bay was in trouble. More than any other single group of organisms, SAV can provide a biological index of the "health" of the Bay's shallow waters. SAV functions as a critical link among the different levels of the Bay food web and the physical environment. It provides both food and habitat for species occupying the higher levels of the Bay's food web. SAV abundance is limited by turbidity and the amount of phytoplankton in the water. The distribution of various SAV species is dependent mostly on salinity and bottom sediment types.

The Bay study concluded that nutrient enrichment was the primary factor in the decline of SAV beds. Nutrients, by fueling the growth of excess phytoplankton, cause a decrease in water clarity and an increase in the number of organisms that grow on the leaves of the SAV. Both of these responses, in turn, cause a decrease in available light for the SAV. Suspended sediments also block light, contributing to the decline.

In addition to the three primary problems, a characterization of the Bay through time revealed discouraging trends in other aspects of the Bay's ecosystem. Long-term decreases in the harvests of several species of finfish and shellfish were indicative of poor water quality, loss of habitat, and over-harvesting of these species.

The CBP recommended various actions to restore and protect the Chesapeake Bay. Measures to limit the amounts of nutrients and toxics reaching the Bay were emphasized. CBP also proposed a coordinated Baywide water quality monitoring system to develop baseline data and record subsequent environmental changes. These data provide the means to measure the success of remedial actions and help to discriminate between natural variability and man-induced change.

Other Areas of Environmental Concern 1977

The seven other areas of environmental concern identified during the Bay Study have been investigated as they relate to the three priority issues, and specifically addressed by:

- **Wetlands alteration**
- **Shoreline erosion**
- **Hydrologic modification**
- **Fisheries modification**
- **Shellfish bed closures**
- **Dredging and dredged material disposal**
- **Effects of boating/shipping on water quality**

Population Growth

The EPA Bay Study recognized that land use and population growth are major factors shaping environmental conditions in the Chesapeake Bay watershed. Ultimately, the number of people living in the Bay basin determines how much water, energy and land are used,

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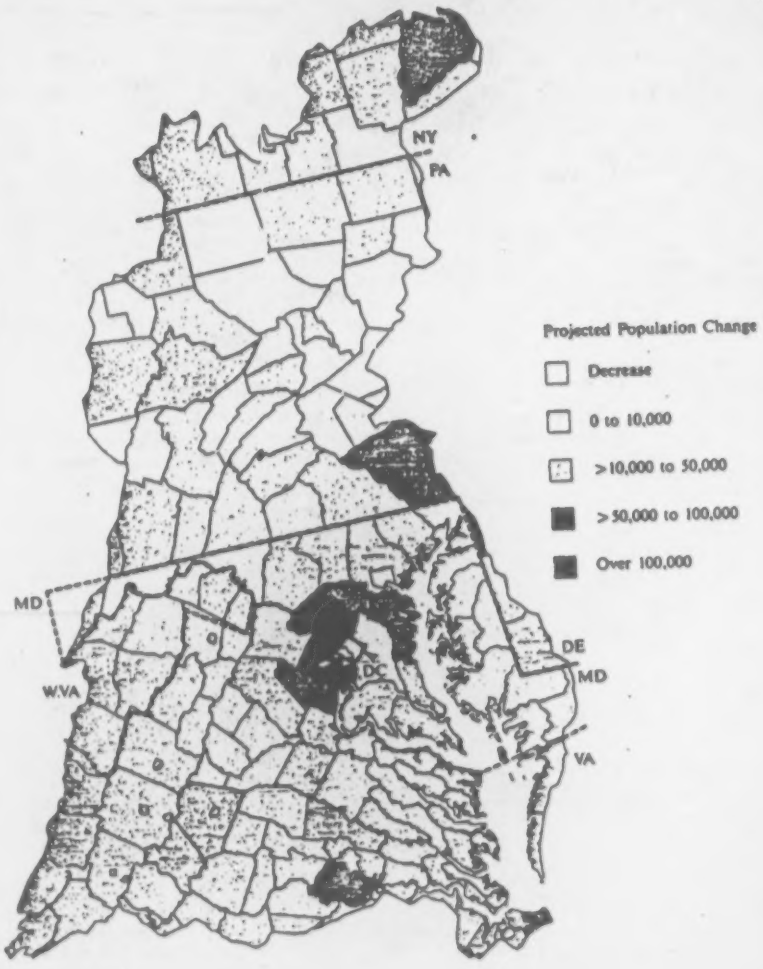

Figure 1-1. Projected Population Change in the Chesapeake Bay Watershed (1985-2000)

3

Table 1-1
Projected Population Growth in the Chesapeake Bay Watershed

	1985	2000	% CHANGE
BELOW FALL LINE			
Population:	8,416,476	9,495,1011	12.8
Acres:	8,960,000	8,960,000	
Density*:	0.94	1.1	
ABOVE FALL LINE			
Population:	7,460,32	8,101,382	8.6
Acres:	27,600,000	27,600,000	
Density*:	0.27	0.29	
TOTAL			
Population:	15,876,798	17,596,483	10.8

*Density = persons/acre

as well as how much and what types of wastes are generated. The wastes then adversely affect long-term biological and economic productivity in the watershed. Population size dictates the demands placed on the Chesapeake Bay ecosystem, and those demands are growing.

In the Bay watershed, population increased 50 percent overall from 1950 to 1980 [8]. The environmental impact was clearly defined in some areas. For example, in the Patuxent River basin, the population increase was greater than 200 percent. The increased municipal sewage discharges and land use changes that accompanied the population growth resulted in low dissolved oxygen levels and high chlorophyll concentrations in the Patuxent. These water quality problems, in turn, were likely the major causes of reduced numbers of finfish and shellfish, loss of species diversity, large reductions of SAV acreage, and low oyster spat set.

The states of the Chesapeake watershed anticipate continued growth in the years ahead. Based on their estimates, population will increase about 11 percent basinwide between 1985 and the year 2000. Figure 1-1 illustrates this projection. It shows high or medium projected increases in counties nearest the Bay, and low increases or actual declines in population in counties above the fall line (zone where a river changes from free-flowing to tidally-influenced). Historically, the area below the fall line has been more attractive to settlement. It now supports a population density three and one-half times greater than that above the fall line (Table 1-1). This concentration of human activities and land use changes below the fall line raises the potential for adverse effects on the Bay.

Population growth brings parallel increases in industry, commercial development, transportation and housing. These increases create conflicts over land use as development competes for farm acreage and wildlife habitat. Changes in land use lead to increased loadings of nutrients and toxic substances, and can modify or even destroy critical living resources habitats (e.g. wetlands). Growth brings construction which disrupts the soil and alters natural runoff and streamflow patterns, and can change water temperature and the salinity regime. As a result, greater volumes of sediment frequently reach Bay tributaries, causing decreased penetration of sunlight vital to vegetation. Sediment also clogs larval fish gills and smothers nonmobile organisms such as clams and oysters. Along with sediments come increasing loads of nutrients, particularly phosphorus.

An increasing population generates additional waste which must be collected, treated, discharged and assimilated. For every 1,000 additional residents, for example, a community must handle roughly 1.5 million more pounds of solid waste a year — not counting any industrial waste generation that might be related to population growth [9]. Each person also means another 75 to 100 gallons of municipal wastewater a day, or 27 to 36 million more gallons per year for every 1,000 additional persons [10].

These additional wastes stress existing solid and hazardous waste and municipal wastewater facilities, as well as the assimilative capacity of air, land and water. Treatment and disposal facilities will need to be upgraded, expanded or constructed just to maintain present water quality conditions. These changes, in themselves, increase demand for land and resources. To restore conditions more favorable to the living resources of the Bay, the means must be found to reduce inputs of nutrients and toxic substances, despite the demands of population growth.

The 1987 Chesapeake Bay Agreement recognizes the need to mitigate the potential adverse effects of continued growth and development. It calls for "development policies and guidelines" to be adopted by January 1989; assistance to local governments in evaluating land use and development decisions; incentives, technical assistance and guidance to encourage wetlands protection; and

steps to ensure that state and federal development projects serve as models for the private sector. Finally, it calls for commissioning a panel of experts to report by December 1988 on anticipated growth and land development patterns to the year 2020 and to outline what will be needed to manage the projected growth.

The 1983 Bay Agreement

Until the 1987 Agreement was signed, the Chesapeake Bay Agreement of December 1983 was the cornerstone of the restoration and protection program. The 1983 Agreement set in motion a coordinated campaign to reverse the decline of living resources in the Bay. It also established the major elements of a cooperative structure to develop and coordinate the comprehensive Bay cleanup: the Chesapeake Executive Council, its Implementation Committee, and EPA's Chesapeake Bay Liaison Office.

Maryland, Virginia, Pennsylvania, the District of Columbia, the Chesapeake Bay Commission and EPA were the original partners in the Chesapeake Bay Agreements. Six other federal agencies formally joined in the Bay cleanup in 1984: Soil Conservation Service (SCS), Fish and Wildlife Service (FWS), National Oceanic and Atmospheric Administration (NOAA), Geological Survey (USGS), U.S. Army Corps of Engineers (CoE) and the Department of Defense (DoD) [1].

Organization

Commitment to restoring the Bay has enabled states whose institutions and political traditions differ and federal agencies with diverse missions to work together to solve common problems while retaining the independence of their programs. The Chesapeake Executive Council provides the leadership and focus that shapes their work (Figure 1-2).

The Council membership includes representatives from each of the four jurisdictions and from the EPA. Chairmanship of the Council rotates among the three State Governors, the Mayor of the District of Columbia, and the representative of the EPA. Operating by consensus, the Council's primary functions are planning and coordination to ensure efficient implementation of programs and projects to restore the Bay.

The Implementation Committee, the Council's operating arm, has 26 members: delegates from the jurisdictions, and representatives of the seven federal agencies and three interstate commissions (Chesapeake Bay Commission, Interstate Commission on the Potomac River Basin, and Susquehanna River Basin Commission). Subcommittees for Planning, Nonpoint Sources, Data Management, Modeling and Research, Monitoring, and Living Resources coordinate work in those categories across agency and state lines. A Scientific and Technical Advisory Committee (STAC), whose membership includes directors of major Bay area research institutions, also assists the Implementation Committee. The Chesapeake Research Consortium*, an organization of Bay research institutions, provides support for STAC through an EPA grant.

The Council has a Citizens Advisory Committee (CAC) to provide a public perspective on policy issues. CAC has 25 members: four appointed by the chief executive in each state, and nine at-large members nominated by the Citizens Program for the Chesapeake Bay, Inc.,

The Chesapeake Bay Agreement of 1983

We recognize that the findings of the Chesapeake Bay Program have shown an historical decline in the living resources of the Chesapeake Bay and that a cooperative approach is needed among the Environmental Protection Agency (EPA), the State of Maryland, the Commonwealths of Pennsylvania and Virginia, and the District of Columbia (the States) to fully address the extent, complexity, and sources of pollutants entering the Bay. We further recognize that EPA and the States share the responsibility for management decisions and resources regarding the high priority issues of the Chesapeake Bay. Accordingly, the States and EPA agree to the following actions:

1. A Chesapeake Executive Council will be established which will meet at least twice yearly to assess and oversee the implementation of coordinated plans to improve and protect the water quality and living resources of the Chesapeake Bay estuarine system. The Council will consist of the appropriate Cabinet designees of the Governors and the Mayor of the District of Columbia and the Regional Administrator of EPA. The Council will be initially chaired by EPA and will report annually to the signatories of this Agreement.

2. The Chesapeake Executive Council will establish an implementation committee of agency representatives who will meet as needed to coordinate technical matters and to coordinate the development and evaluation of management plans. The Council may appoint such ex-officio nonvoting members as deemed appropriate.

3. A liaison office for Chesapeake Bay activities will be established at EPA's Central Regional Laboratory in Annapolis, Maryland, to advise and support the Council and committee.

* The Consortium's administration center rotates among member institutions, and currently is located at the Virginia Institute of Marine Science.

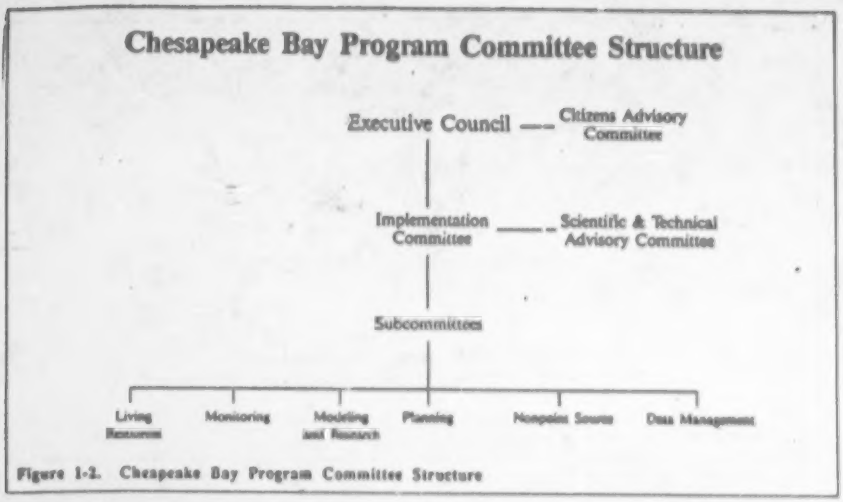

Figure 1-2. Chesapeake Bay Program Committee Structure

which also staffs the CAC under an EPA grant.

EPA's Chesapeake Bay Liaison Office provides administrative, technical and public information support to the Council and its auxiliary groups. Staff members administer grants and contracts, perform special projects and provide technical advice and support.

State Programs

Participants in the Bay cleanup recognize that the economic future of the region is dependent on a revitalized Bay. They look forward to a time when Bay waters can again produce rich annual harvests of fish and shellfish. Therefore, even before the Bay Agreement was signed, the four jurisdictions had programs in place and plans underway for additional corrective action. Together, they have spent over $250 million since 1984 to support Bay initiatives.

State programs are comprehensive. They include varied projects to restore living resources and research to better understand the habitat requirements of desirable plant and animal species, as well as point and nonpoint source pollution control programs and legislative initiatives [12, 13, 14, 15].

Through their leadership and participation in Agreement groups, the states have shared information on technology improvements, experiments and demonstrations, implementation of nonpoint source controls, and innovative citizen involvement and information projects. They have advocated the adoption of both agricultural and urban best management practices (BMPs) which reduce runoff, erosion and sedimentation, and improve water quality. Each state targets its control efforts to the areas which have the greatest potential for generating water pollutants (see Figures 1-3 through 1-6).

Federal Programs

Each of the seven federal agencies in the Bay Program participates in Executive Council committee work, contributes staff experience and expertise to the Program and the states as needed, and helps to build public awareness of the Bay restoration effort. Some of the agencies have initiated programs specifically for the Chesapeake Bay; all have focused on the Bay in regional implementation of their national programs [3].

The SCS placed a coordinator in the EPA Bay office in November 1984 to ensure that its many field people in the region were closely tied to the Bay Program. Through them, SCS has reached, and helped the states to reach, many farmers with information and technical assistance to implement practices to prevent erosion and improve water quality. USGS provides fall line monitoring on Bay tributaries and works with Pennsylvania and Maryland to perform intensive monitoring of pilot watersheds and plots of land to demonstrate the impact of nonpoint source controls.

The FWS has been particularly effective in developing and disseminating public information about the Bay's living resources, and continues to give key support to citizen volunteers who annually survey SAV in the Bay and its tributaries. The FWS also conducts limited point

6

■ Top 24 Watersheds (EPA Grant Funds Are Targeted Here)
■ Other MACS Priority Watersheds (Funded with State and Non-EPA Monies)

Figure 1-3. Maryland's Agricultural Cost-Share (MACS) Program Priority Areas.
Source: Maryland Department of Agriculture.

■ Christiana-Sunnyside association: urban land and deep, nearly level to steep, well-drained soils that are underlain by unstable clayey sediment; on uplands

Figure 1-4. Highly Erosive Soils of the District of Columbia.
Source: *General Soil Map District of Columbia*, USDA Soil Conservation Service, U.S. DOI, National Park Service, National Capital Press, 1975.

Chesapeake Bay Program Area (Level I) (48 Counties)
Animal Waste Priority Area (Level II-A) (7 Counties)
Cropland Priority Area (Level II-C) (23 Counties)
Demonstration Watersheds (Level III)
Portion of Virginia not draining to the Bay (includes Virginia Program Area [29 Counties] and Chowan River Program Area [6 Counties])

Figure I-5. Areas Targeted for Agricultural BMP Cost-Share Funds in Virginia.

Source: *1987 Virginia Agricultural BMP Cost-Share Program*, Virginia Department of Conservation and Historic Resources, Division of Soil and Water Conservation, July 1986, p.1.

Initial Watersheds Selected for Implementation
Additional Watersheds Selected for Implementation
Note: Areas on map without watershed details do not drain to the Bay.

Figure I-6. Pennsylvania's Priority Watersheds for Agricultural BMP Implementation Under the Chesapeake Bay Program.

Source: Pennsylvania Department of Environmental Resources, Bureau of Soil and Water Conservation.

area nonpoint source monitoring, biomonitoring, living resource trend analysis, and a striped bass hatchery release program.

NOAA has contributed research support through its Sea Grant Program and conducted stock assessment work on key finfish species. With the CoE, NOAA is also working with the states on fisheries habitat enhancement projects in the Bay [16].

The CoE provides expertise for developing models of the Bay and its tributaries. The Corps performed a study of the effect of low flow on living resources, and contributes to habitat and water quality enhancement through demonstration projects under its shoreline erosion program.

The DoD has assessed 66 of its Bay area installations to identify potential water quality impacts and to set priorities for additional pollution control projects [17].

Over the past ten years, DoD has spent over $200 million to improve point source controls, land management practices and other related activities. DoD and EPA have agreed to strengthen requirements in DoD's discharge permits and ensure their timely review.

EPA also pursues Bay Program goals through regional implementation of numerous laws which the agency administers. More information about state and federal programs as they relate to goals of the Bay Program will be found in the next section.

Evolution of Goals

The restoration and protection of the Chesapeake Bay has been a dynamic program from the start, with goals evolving as scientists and managers gained a broader understanding of the estuarine ecosystem. The 1983 Chesapeake Bay Study final report [18], the Resource Users Management Team final report [19] and the 1983 Chesapeake Bay Agreement set forth a series of goals (see box). These goals focused on improving the health of the Bay by reducing the flow of nutrients, sediments and toxic substances into the Bay and its tributaries. All also recognized the need for coordination.

These common threads were woven into the statement of purpose included in the 1985 Chesapeake Bay Restoration and Protection Plan [1], "to improve the water quality and living resources of the Chesapeake Bay estuarine system so as to restore and maintain the Bay's ecological integrity, productivity and beneficial uses and to protect human health." Five broad goals also were outlined in the Plan. These goals and the programs initiated to achieve them are described below.

Living Resources

The focus of nutrient, toxic substances control and related programs, as well as institutional management efforts, is the living resources of the Bay. As stated in the 1985 Plan, the goal is to "provide for the restoration and protection of the living resources, their habitats and ecological relationships."

To accomplish this goal, state and federal agencies have expanded resource management activities as well as point and nonpoint source control efforts. Each year over $10 million is directed toward fisheries management activities. These funds support development and implementation of specific species fisheries management plans, stock assessments, enforcement of regulations regarding catches, and protection of critical habitats.

Maryland, the District and Virginia have programs to regulate fishing for striped bass (rockfish). At the same time, they are increasing striped bass breeding stocks by releasing tagged hatchery-raised fish. The FWS is assisting with the hatchery and tag return programs. Pennsylvania is continuing to implement a striped bass stocking program in the Conowingo Pool and Reservoir.

NOAA's stock assessment efforts help monitor the

1983 Goals for Chesapeake Bay

The September 1983 final report of the EPA Bay Study, A Framework for Action, contained an overall goal: "to restore and maintain the Bay's ecological integrity." That goal was to be pursued by gathering monitoring data that would help the states to develop water quality standards based on resource use attainability, establishing programs which would attain nutrient and dissolved oxygen concentrations necessary to support the living resources of the Bay, and mitigate the potential or demonstrated impact of toxicants on the living resources of the Bay. Management coordination was seen as vital to these efforts.

The Resource Users Management Team (RUMT), the Study citizen advisory committee, chose a goal they felt would be comprehendible, measurable and achievable: to "provide for the restoration of finfish and shellfish stocks on the Bay, specifically the abundance and diversity of freshwater and estuarine spawners." RUMT recommended a series of pollution control, land management and resource management actions to enhance water quality, manage fisheries and restore habitat. Coordination of efforts to reduce inputs of nutrients, sediments and toxic contaminants to the Bay system had to be provided to achieve best results.

In December 1983, when they announced the Chesapeake Bay Agreement, the signatories issued a joint statement containing the following goals: "to improve and protect the water quality and living resources of the Bay system; to accommodate growth in an environmentally sound manner; to assure a continuing program of public input and participation on regional issues of Bay management; to support and enhance a regional cooperative approach toward Bay management."

results. NOAA, FWS and the four jurisdictions are developing Baywide stock assessment plans to monitor important species and to examine historical trends and relationships between fisheries abundance and environmental conditions.

Under the Susquehanna River Anadromous Fish Restoration Committee's program to restore the American shad to the Susquehanna River, over 7200 fish were stocked upstream of the Conowingo Pool in 1987 for spawning in the river. Maryland and Virginia annually plant oyster shell and seed oysters in an attempt to rebuild the oyster fisheries of the Chesapeake.

SAV has been the focus of major cooperative efforts by Virginia, Maryland, the CoE, USGS, FWS, EPA, area universities and citizen organizations for several years. Experiments in replanting Bay grasses in areas where they were known to exist in the past have helped develop an understanding of the water quality conditions they require. Mapping their distribution from periodic photographic surveys (see SAV in section following) helps indicate improvements in water quality. Species information is obtained mainly from state supported ground surveys supplemented by a citizens' "ground-truthing" program which has been operating since 1985.

Recent FWS mapping of wetlands, another category of critical habitat, produced a mixed picture [20]. In some areas, programs to protect, maintain, and even create wetlands are working well. In the case of tidal wetlands, the depletion rate has decreased greatly since 1970, thanks to state legislation. However, nontidal wetlands are still being lost to development at an alarming rate, and protective legislation is needed. The 1987 Agreement commits participating governments "by December 1988, to develop, and begin to implement a Baywide policy for the protection of tidal and nontidal wetlands" and to encourage local governments to incorporate protection of wetlands in land use and other growth-related decisions.

The states are working with local land owners and developers to explain the value of retaining all wetlands. They are also helping land owners to reduce shoreline erosion and to find ways to maintain low density land use near the shore. In Maryland, the Critical Areas statute [21] requires counties and major municipalities to submit plans for development in a 1,000 foot zone surrounding the Bay and along its tributaries using state guidelines for density. In "Resource Conservation Areas," only low density development is allowed.

In 1987, the Living Resources Task Force of the Implementation Committee began to define the optimal water quality conditions and ranges necessary to support and maintain key living resources, their habitats, and support organisms. Chapter 2 describes the processes used and the progress made in developing living resources objectives. The newly formed Living Resources Subcommittee has a major role in meeting several of the key commitments in the 1987 Bay Agreement: the development and adoption of guidelines to protect water quality and habitat conditions necessary for the Bay's living resources by January 1988; implementation of a Baywide plan to assess commercially, recreationally and selected ecologically valuable species and adoption of a schedule for developing management strategies by July 1988; and a start on implementing Baywide management plans for oysters, American shad, and blue crabs by July 1989.

Nutrients

State and federal participants in the Bay Agreement have expanded and begun programs to meet the nutrients goal of the 1985 Plan: "to reduce point and nonpoint nutrient loadings to attain nutrient and dissolved oxygen concentrations necessary to support the living resources of the Bay."

Sewage treatment plant construction and upgrading continue to be a priority throughout the region. More than $200 million has been spent on treatment plants in the Chesapeake drainage basin since 1984. The successful operation of the Blue Plains Wastewater Treatment Facility in the District produced nearly immediate improvements in living resources [9].

Proper operation and maintenance of plants also is reducing amounts of inadequately treated wastewater being discharged. Projects to demonstrate the cost effectiveness of dual nutrient biological treatment of sewage are under way. These projects on the Patuxent River in Maryland and on the York River and at Kilmarnock in Virginia also will influence development of a Baywide nutrient policy as well as state standards for phosphorus and nitrogen.

In Virginia, the legislature has ordered development of nutrient standards for the waters of the state [22]. Implementation of these standards is to begin by July 1, 1988. Maryland's General Assembly in May 1986 required that by July 1, 1988, the State's Executive Council members modify the Chesapeake Bay Restoration Plan as it pertains to Maryland to include specific goals and strategies to address nutrients, including suggested target loads for each tributary, and point and nonpoint control strategies capable of achieving those loads [23].

Pennsylvania has had phosphorus control standards for point source dischargers within the Lower Susquehanna River basin since 1970. These regulations were revised and strengthened in 1985 and are being implemented.

DoD has conducted a demonstration operator maintenance training and assistance program at two of its Bay area wastewater plants, and the Army has implemented a similar program at most of its plants. Performance improvement is measurable.

The states also have been working to reduce the flow of nutrients from nonpoint sources such as faulty septic systems, urban and farmland runoff, and leaching.

Voluntary cost share projects helping farmers to prevent erosion and manage animal waste are supported

10

by the states, EPA, SCS and local conservation districts. The Cooperative Extension Service and the Agricultural Stabilization and Conservation Service (ASCS) also have programs which deliver financial, technical and information services to farmers. With their Mobile Nutrient Laboratory (PA) and Rainfall Simulators (VA/MD), the states have demonstrated to the agricultural community crop nutrient requirements and methods to reduce losses of chemicals and nutrients through specific farming practices. Results of nonpoint efforts are monitored by the states, USGS and, in selected areas, the FWS. Maryland's demonstration farm has monitoring equipment which is assessing BMP effectiveness.

As a demonstration of nonstructural techniques to reduce shoreline erosion, the states and the CoE are planting vegetation to stabilize river and shoreline banks, curbing another nonpoint source of sediments carrying nutrients to waterways. In urban and suburban areas stormwater management has taken on increased importance. States and counties are emphasizing enforcement of erosion and sedimentation regulations. In Maryland, Virginia and the District of Columbia, for example, regulations require developers to maintain runoff at no more than pre-construction rates.

Phosphate detergent bans are now in place in Maryland, the District of Columbia and Virginia. Pennsylvania members of the Chesapeake Bay Commission are having a study conducted to determine the potential effects on Bay water quality of a phosphate ban in that state.

As the states and federal agencies continued to implement their point and nonpoint source control programs, the Bay Program completed the Steady-State Model of the Bay. This water quality model uses mathematical equations to simulate the Bay's response to nutrient loadings. The model helped solve an important piece of the nutrients puzzle. Scientists knew that nutrients from the land, air and decayed organic matter (algae) are stored in and released from bottom sediments. The model demonstrated that sediments in the Chesapeake Bay hold a tremendous reserve of nutrients, and that "fluxes" of nutrients can be released to the overlying water column in much greater quantities than previously thought.

Reductions in the supply of algae-fueling phosphorus and nitrogen to the Bay are vital to stop their continued build up in bottom sediments and subsequent recycling. A slowdown in algae production and recycling is critical because of the high oxygen demand during algae decay. Low oxygen availability severely limits biological processes, especially those of bottom-dwelling species (see Chapter 3).

Toxic Substances

Elevated levels of toxic compounds, like excess nutrients, adversely affect finfish, shellfish and Bay grasses. Both individual organisms and the diversity of the ecosystem are threatened by toxic pollutants. The higher the concentrations of heavy metals and organic chemicals in an area, the less likely that desirable species will be found in numbers capable of maintaining populations. The toxics goal stated in the 1985 Plan is to "reduce or control point and nonpoint sources of toxic materials to attain or maintain levels of toxicants not harmful to humans or living resources of the Bay."

Since the major sources of toxic contaminants are industries and sewage treatment plants, provisions and enforcement of wastewater discharge permits under the National Pollutant Discharge Elimination System (NPDES) are of priority concern to the states and the EPA. Because chlorine can be toxic to finfish and shellfish, states have reduced use and discharge of the chemical at wastewater treatment plants, especially during critical life stages of marine life. Alternative chemicals (ozone) and techniques (ultraviolet, dechlorination prior to discharge) are used to remove chlorine from the discharge and still assure that public health is protected.

Pretreatment requirements are beginning to reduce amounts of metals and chemicals in wastewater these industries send to sewage treatment plants. In Pennsylvania, 35 plants in the Susquehanna River Basin required to have pretreatment now have EPA-approved programs in place. State regulations were approved in final form in December 1987. Pennsylvania anticipates applying for EPA delegation of the pretreatment program authority in 1988. Virginia also expects to get delegation authority in 1988: Marylland was given delegation previously. The District's pretreatment program has been developed, and permits for industrial dischargers are being prepared.

Stormwater management and other nonpoint source controls in urban areas also reduce the flow of toxic contaminants reaching surface waters of the Bay area. Similarly, agricultural nonpoint source controls to reduce runoff, nutrient loadings and sedimentation also decrease the flow of soil-associated pesticides and other chemical organics to waterways.

Sediments in harbors, embayments and the Bay are a sink which can accumulate toxic substances, just as they do nutrients. Continued sediment monitoring in such areas can indicate whether control programs are successful in reducing the flow of contaminants.

Two highly industrialized areas with recognized accumulations of toxics in sediments, Baltimore Harbor and the Elizabeth River at Hampton Roads, were selected for concentrated study and toxic contaminants control actions. Maryland and Virginia are working with EPA to improve detection of toxic contaminants and trace their sources, using both biological and chemical testing. FWS is also involved in biological testing at selected locations. EPA demonstrated new marine chronic toxicity testing procedures in Virginia in 1986, and that Commonwealth has since incorporated this biologically oriented examination of effluents into its other regular procedures [4]. Working with USGS and SCS, Virginia is developing a geographic information system (GIS) for the Elizabeth River. The GIS technology improves Virginia's

capability to detect and identify both point and nonpoint sources of toxic contaminants.

The Baltimore Harbor integrated environmental management study is examining how EPA's regulatory programs for air, water and land management relate to each other and to decisions of state, county and local government units in Maryland.

Related Matters

The Baltimore Harbor study recognizes that many decisions, programs and projects that affect the Bay are not directly tied to the Chesapeake Bay Program. Cooperating federal agencies administer many laws which affect the Bay though they are national in scope (e.g., Toxic Substance Control Act; Clean Water Act; Marine Protection, Research and Sanctuaries Act; Comprehensive Environmental Response, Compensation and Liability Act (Superfund); Resource Conservation and Recovery Act (RCRA); River & Harbors Act; Fish & Wildlife Coordination Act; Safe Drinking Water Act; Coastal Zone Management Act, and the Food Security Act of 1985). Many other state and federal programs and laws relevant to the Bay are the responsibility of agencies not involved in the Agreement. With this in mind, the Executive Council's 1985 plan included this goal: "develop and manage related environmental programs with a concern for their impact on the Bay."

Cross-media pollution (e.g. land generated pollutants to water and air) has long been recognized, but managing programs to alleviate cross-media effects is relatively new. At times, integrated approaches can be difficult to implement, even within a single agency. Specific missions and methods can differ, though the goals of environmental enhancement and protection are the same.

At EPA, cross-media integration became a national priority in 1986. This step, combined with the Water Quality Act of 1987 [24], which not only recognized the Chesapeake Bay Program, but also the potential effectiveness of a geographic specific approach to pollution control and resource enhancement, has stimulated and simplified cross-program cooperation. Within EPA, the Bay Program has ties with national wetlands protection, pesticides management, ground water protection and nonpoint source control programs, as well as Superfund and RCRA.

Because of those ties, the Bay Program is the starting place for many regional environmental management efforts. In 1986, tributyltin sampling efforts undertaken by EPA [25], Navy, Maryland, and Virginia were coordinated through a multi-agency technical work group. The states of Maryland and Virginia used findings from these studies to restrict the use of tributyltin-based paints on recreational boats and commercial vessels. EPA is continuing to use the same data in its development of national water quality criteria and as part of the technical basis for national regulatory action.

The states have worked to explain the implications for the Bay of activities such as highway construction and maintenance. Through SCS's efforts, the Bay area staff of ASCS and the Forest Service (both in the U.S. Department of Agriculture) recognize the impact their work has on the Bay. The CoE considers the environmental impacts of dredged and fill materials, construction permits and changes to wetlands. As part of the Baltimore Harbor and channel deepening project in Maryland and Virginia waters, the CoE is monitoring the effects of dredging.

Leachate to ground water from hazardous and solid waste disposal sites, sludge and dredge disposal, long range transport of air pollutants and the potential effects of nonpoint source controls on ground water are now being factored into the development of control strategies. It is also recognized that local land use decisions can have a major impact upon the Bay, indicating a need for closer integration with the Bay Program in the future. (Maryland's Critical Areas Program, with its county orientation, provides opportunities for such integration.) The 1987 Chesapeake Bay Agreement also underscores the importance of these factors in its sections on Water Quality and Population Growth and Development.

Though regulation is the primary focus, the states also are working to improve and maintain public access to the resources of the Bay. If people can use and enjoy the bounty of the Bay, they are more likely to understand and value it. Public access to beaches, parks and forested lands, as well as recreational and commercial fishing opportunities, are being improved and expanded in a manner consistent with the Related Matters goal in the Plan. Further, the 1987 Bay Agreement pledges to "intensify our efforts to improve and expand public access opportunities being made available by the Federal government, the States, and local governments by developing a strategy by July 1988."

Institutional/Management

Coordination and cooperation are the keystone for successful accomplishment of the entire Bay Program. For that reason the Chesapeake Executive Council and many federal, state, regional, and local private and public organizations have long been working together to implement a fourth goal: "support and enhance a cooperative approach toward Bay management at all levels of government."

Through the Nonpoint Source Subcommittee, the states have shared their knowledge and techniques to enhance their programs in stormwater management, sedimentation/erosion control, and targeting for BMPs implementation. As another example of cooperation, the states agreed in 1987 to reduce the amount of EPA money available for state implementation grants in order to support development of improved Bay modeling capability.

A prime example of cooperation is the comprehensive Baywide monitoring program in which all four jurisdictions and many of the federal agencies participate. Sam-

pling and analysis techniques are compatible, and data management, the acquisition of additional data bases, and necessary computer equipment are cooperatively funded.

The monitoring program is supplemented by citizen monitoring on the James (VA), Patuxent (MD) and Conestoga (PA) rivers. The success of these pilot programs funded by the Bay Program grant to the Citizens Program for the Chesapeake Bay, Inc., has prompted many watershed associations and some local government units to request help in starting similar projects. In addition, Maryland and Virginia are developing plans to expand the participation of citizens in collecting water quality data. Citizen near-shore monitoring data will be used to supplement tributary and Bay mainstem information collected by the states.

Now an integral part of the Bay Program, citizen monitoring began as one of many educational opportunities to increase public awareness and understanding of the Bay system. The states and federal agencies have been expanding such opportunities since the 1983 Agreement was signed. They have used radio, television and print media, speakers bureaus, literature, exhibits, field trips, slide shows and films, demonstrations, citizen advisory groups, in-school education, public meetings and other mechanisms to disseminate Bay Program information.

People of the region can expect further expansion of these opportunities for information and participation. The 1987 Agreement calls for coordinated education and information communication plans, and provision for public review and comment on all implementation plans.

The Executive Council's CAC and the Citizens Program for the Chesapeake Bay, Inc., have proven to be excellent links to the concerned public of the region, and state committees have been helpful to policy making agencies in Pennsylvania, Maryland and Virginia. Such mechanisms provide a means for public input and participation. They also help assure the accountability of state and federal agencies and the Bay restoration and protection effort as a whole.

Tracking and evaluating programs are other ways to provide accountability. But the ultimate measure of success will be the effects upon the water quality and living resources of the Bay.

Measuring Results

Implementation of the Chesapeake Bay monitoring program reflected the need for a coordinated and integrated data gathering network in order to characterize the Bay system as a whole and to establish short- and long-term water quality trends. Prior to 1984, the existing data base was sufficient for characterizing the Bay's conditions and determining its most severe problems. The data base provides historical information through 1980. This can be used to expand trend analysis capabilities now available. However, the EPA study data base was of limited value due to differences in methodology and discrepancies in sampling times and locatio

In 1984, expanding on their existing tributary monitoring programs, Maryland and Virginia began monitoring water quality conditions in the mainstem of Bay with a 50-station network supported by EPA gran By 1986 the overall coordinated network had expanded 167 stations. Today, it reaches all major tributaries up t and beyond the fall line, and includes biological sampli and collection of sediment cores as well as water quality analysis. The 1987 Agreement calls for continued support of the monitoring efforts and accompanying dat management work.

Results of the monitoring program from 1984 and 1985 have been summarized in the "State of the Bay Report" [26] and its supporting "Technical Compendium." [27] The publications emphasize that trend analysis will requ several years of systematic data collection.

Initial results, however, do begin to provide the new requisite Baywide baselines to measure the effects of remedial actions.

Submerged Aquatic Vegetation

The SAV photographic survey, funded jointly by the FWS, EPA, Maryland Department of Natural Resources (DNR), Virginia Council on the Environment, NOAA, and the CoE, has been conducted annually since 1984. There were occasional surveys prior to 1984, including a major Baywide baseline survey in 1978 and annual field surveys conducted by Maryland DNR since 1971. In addition to the aerial photographs used to locate SAV bed and "groundtruthing" by survey teams, supplementary information is provided by citizens participating in the "SAV Hunt." This composite information is used to create SAV maps for the entire Bay, providing year-to-year comparisons of SAV distribution and abundance.

SAV in the Chesapeake Bay was in decline from the 1960s to the early 1980s. Findings from the 1984 and 1985 SAV surveys, however, provide some measure of hope that in some areas this trend has been reversed. Over that one-year period, SAV increased by 26 percent (47,893 acres) Baywide, with the largest rise occurring in the mid-Bay [28]. Recently released 1986 figures show a slight increase (369 acres) over the 1985 coverage [29].

It is not yet clear whether the increases were due to natural variability, including rainfall changes, or occurred in response to Bay management efforts. An 18-year trend analysis of Baywide SAV data is being carried out by FWS to establish more precisely the changes in SAV abundance and to attempt to discriminate between natural and man-induced changes. For two areas, one in Maryland, another in Virginia, FWS is reviewing information on SAV back to the 1930s. SAV will continue to be an important measure of the revitalization of the Bay. As annual and long term fluctuations in abundance and distribution are more fully understood, SAV will become more important in assessing the health of the Bay's shallow waters (see Chapter 2).

Nutrient Enrichment

The States of Maryland and Virginia, under grants from EPA, are responsible for monitoring in the Bay's mainstem. Although nutrients (nitrogen and phosphorus) are of primary concern, other physical and chemical parameters also are analyzed under the scope of their programs. Through the Monitoring Subcommittee, methodologies are being standardized and sampling schedules coordinated as closely as possible, allowing data from the two state programs to be treated statistically as a whole [30].

Along with Maryland and Virginia, the District of Columbia, Pennsylvania, the Susquehanna River Basin Commission and the USGS are involved in monitoring Bay tributaries. FWS had a two-year sampling and analysis effort on the Choptank River. Monitoring both the tributaries and fall line is crucial to understanding nutrient cycling within the Bay system. In addition, small scale intensive monitoring projects such as those in Nomini Bay and Double Pipe Creek are important to demonstrate the effectiveness of best management practices in defined geographic areas. The magnitude of freshwater flow in a river is closely related to nutrient loads ultimately discharged to the Bay. Findings of 1984-1985 tributary monitoring indicate that other factors specific to individual watersheds (e.g. weather conditions which change flows) also dictate the nutrient loads delivered by each tributary. The 1984 and 1985 water quality data from the mainstem monitoring program provide two contrasting sets of information on the Bay: 1984 was a wet year and 1985 was dry.

The difference in basinwide precipitation had a major effect on Bay dynamics. The greater than average precipitation in 1984 flushed higher nutrient loads to the Bay and intensified stratification, the layering of fresh and saltwater that inhibits vertical mixing of surface and bottom waters. The result was an increase in anoxic and hypoxic bottom waters. The less than average precipitation in 1985 allowed saline waters to reach further into the Bay and up the tributaries. With those waters came some of the parasites and diseases which affected Maryland's oyster fishery.

The natural variability inherent in the first two years of water quality data underscores the need to maintain a consistent, quality-controlled data collection effort over the long term. The baseline against which the success of management actions must be measured cannot be truly delineated until sufficient data are available to statistically distinguish natural responses of the system from those induced by man. Against a noisy background of natural variability, it may take several years before the effects of management actions become apparent. Satellite imagery and other high technology methods may help distinguish trends from natural variability. The sophisticated Time Variable Model being developed by the EPA and CoE should also help by more accurately predicting the impacts of nutrients on the Bay and evaluating potential point and nonpoint control strategies.

Toxic Substances

Because of concern over toxic contaminants raised by findings of the original research study, monitoring programs for numerous toxicants in the bottom sediment also began in 1984.

Benthic surveillance data from Maryland and Virginia provide a picture of the broad distribution of toxic substances throughout the Bay. In addition, monitoring is clarifying the dynamics of water column/sediment exchange of toxic substances in relation to grain size and organic content of the sediment. Information from NOAA's Status and Trends Program supplements the Maryland and Virginia monitoring efforts. The NOAA Program focuses on biological accumulation of toxic materials in certain Bay species. In 1985 and 1986, FWS also obtained data on toxics accumulation in certain organisms from selected sites.

The initial monitoring of toxic substance levels and their relationship to sediment distribution is providing the information necessary to develop a toxics baseline for the Bay. Ongoing monitoring will allow assessment of the effects that control measures are having on reducing input of toxic contaminants to the Bay. Special studies, such as EPA's survey of TBT [25], supplement monitoring data.

Making the Connections

Monitoring of nutrients, toxic substances, and SAV abundance undertaken since 1984 is beginning to provide, for the first time, a Baywide perspective on the various responses and fluctuations of this complex ecosystem. As monitoring continues, these different data sets will be integrated so critical links between the water and sediment quality and living resources can be better understood. Comprehension of these relationships will be an important element in the next phase of the Chesapeake Bay restoration program.

Future Directions

The Chesapeake Bay Study initiated in 1975 forged the first links in the state/federal/public partnership--the keystone of today's program. By the time the final reports of the congressionally mandated study were released by EPA in September 1983, the commitment to undertake and fund the Bay restoration was cemented.

The states and EPA then signed the Chesapeake Bay Agreement in December 1983, and began Phase I of the coordinated cleanup effort, building upon progress made in wastewater treatment plant construction and upgrading. Programs are in place to address the most obvious problems identified in 1983 (excess phosphorus and nitrogen, toxic substances and declines in living resources), monitoring data are being collected and analyzed, and models are providing theoretical projections of the pounds of nutrients and tons of sediment kept from Bay waters.

Monitoring data eventually will reflect the positive

results of state and federal pollution control programs. However, today it is still unclear whether the scope and size of restoration and protection programs are sufficient to produce reasonable progress. In 1986, the Executive Council decided that it needed a more precise measure of the impact of programs on water quality. How can the Council determine if the rate of progress is reasonable? Or be certain that results are occurring in areas that benefit living resources most effectively?

To answer these and other questions, the Executive Council adopted the Phase II program evaluation and development process in 1986 [illegible]. Phase II is the next step in the Chesapeake Bay Program, the logical extension of a continuum that began in the mid-1970s (Figure 1-7). The process has four basic steps:

1. Establish water quality, living resources, and habitat objectives;

2. Determine reductions in pollution loadings needed to meet the objectives;

3. Evaluate the technical alternatives and pollution control measures which could be used, according to their costs and effectiveness;

4. Suggest what should be done, where, over what period of time, at what cost, and with what expected results.

Through the Phase II process, managers will gain a greater understanding of the Bay ecosystem and its needs. Based on that understanding they will be better able to focus restoration and protection efforts and more clearly define the type and extent of additional pollution controls needed. Phase II also will enable managers to determine costs and predict results, including the potential consequences of future restoration and protection actions.

Phase II directly supports meeting the commitments in the 1987 Chesapeake Bay Agreement. The following objectives of Phase II tie to three major milestones in the Agreement:

Living Resources. Identify key species and associated support species, locations of their habitats, and conditions required during critical life stages of each species. The 1987 Agreement requires guidelines by January 1988.

Nutrients. Define the roles of phosphorus and nitrogen in polluting the Bay and its living resources, and determine how best to reduce loadings. The 1987 Agreement requires a plan by July 1988 to reduce loadings of these nutrients by 40 percent by the year 2000.

Toxic Substances. Develop a comprehensive strategy for controlling sources of toxic contaminants entering the Bay system and managing those now in the system. The 1987 Agreement pledges that a toxics reduction plan will be adopted by December 1988.

The approaches used in Phase II and the progress toward attainment of each of these objectives are described in Chapters 2, 3 and 4.

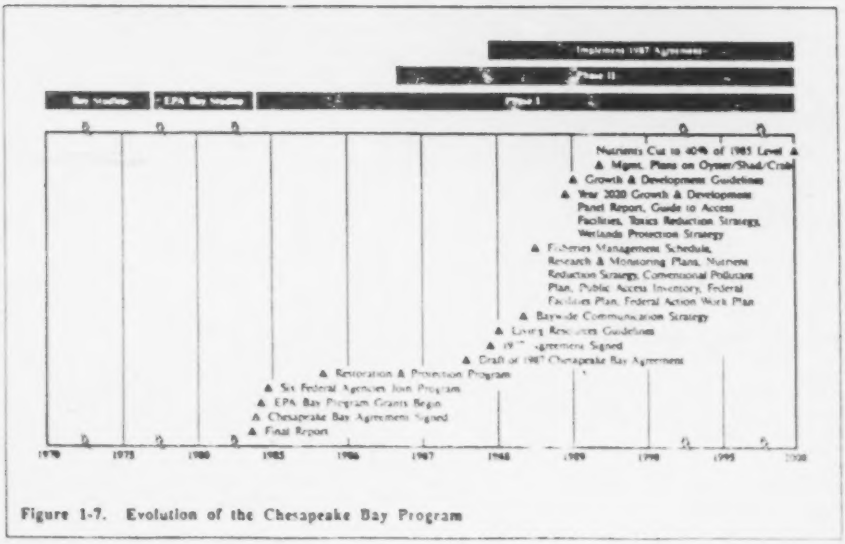

Figure 1-7. Evolution of the Chesapeake Bay Program

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Beth Millemann
Executive Director

STATEMENT OF

BETH MILLEMANN, EXECUTIVE DIRECTOR
COAST ALLIANCE

Before the
Water Resources Subcommittee
Committee on Public Works and Transportation
U.S. House of Representatives

Concerning
The Need for National Sediment Legislation

May 16, 1990

36-788 0 - 91 - 8

Good afternoon. My name is Beth Millemann, and I am Executive Director of the Coast Alliance, a national coalition of coastal activists dedicated to protecting and wisely managing the resources of the nation's four coasts: Atlantic, Great Lakes, Pacific and Gulf. I would like to thank Chairman Nowak and the members of the subcommittee for the opportunity to testify on this important issue.

The threats to human health and the environment posed by contaminated underwater sediments have prompted hundreds of citizen groups to make the issue of underwater contamination a national concern. On January 31, at 13 concurrent press events around the country, a "Citizens Charter" calling for a national program to address contaminated sediments was released by the Coast Alliance and other environmental and citizen organizations. An unprecedented number of local, state, national and international organizations endorsed the Citizens Charter: 235 labor union, health, fishing, sporting, environmental and citizen groups have joined in calling for steps to be taken to address this national problem. Since much of what I will discuss and recommend today is drawn from our charter, I have attached a one-page summary of it, and a list of the 235 endorsing organizations, for your information. (The full text of the charter is available at no charge from the Coast Alliance.) I strongly urge members of the subcommittee to study it, as it reflects a shared opinion, reached by hundreds of organizations across the country, on actions that must take place to clean-up America's toxic underwater lands. To understand what those actions should be and why they are necessary, it is important to first look at the extent of the

contamination of our underwater lands, and the grave threats to the environment and human health posed by this contamination.

1. Extent of Contamination of Underwater Sediments

The water in America's bays, estuaries, the Great Lakes, rivers and coastal areas lies in a contaminated bed. According to a 1987 study conducted for the Environmental Protection Agency (EPA), "there are hundreds of sites in the United States with in-place pollutants at concentration levels that are of concern to environmental scientists and managers. These sites include all types of water bodies and are found in all regions of the country." The study states that every major harbor in the United States may be considered to be contaminated from sources upstream, in the adjacent area, and from ship traffic. The 1987 study concluded that it is likely that in-place pollutants occur in all types of U.S. water bodies.

Research conducted by the National Oceanic and Atmospheric Administration (NOAA) echoes the EPA report. Since 1986, NOAA's National Status and Trends Program has been systematically monitoring 200 estuarine and coastal sites, checking mussels, oysters and sediments for different pollutants. NOAA's study has revealed that the highest levels of contamination for any pollutants were near the major harbors of Boston, New York, San Diego, Los Angeles and Seattle. This study focused on large general areas, not isolated "toxic hotspots" within these areas. According to July 1989 testimony given by NOAA's Charles Ehler, Director of the Office of Oceanography and Marine Assessment, "these data reveal the truly national extent of the

problem of toxic contamination of sediment, fish, and shellfish throughout the coastal waters of the United States."

The NOAA and EPA diagnosis was further corroborated by the National Research Council's 1989 report on contaminated marine sediments. After examining data from public agencies and private research centers, the National Research Council's Committee on Contaminated Marine Sediments concluded that "sediment contamination is widespread throughout U.S. coastal waters and potentially far reaching in its environmental and public health significance."

Each of America's four coasts are experiencing problems from in-place contaminants. In the U.S. portion of the Great Lakes alone, 27 areas have been identified with contaminated sediment problems. The marine coasts are experiencing similar difficulties. I have attached documents listing Great Lakes and marine coast contaminated sites, and maps that indicate the location of these sites. I direct the subcommittee's attention to these lists for a better sense of the extent of sediment contamination in our waters.

However, these lists include sites that have been identified to date. Particularly regarding the marine coasts, it is likely that many additional contaminated sites exist. Indeed, in the 1987 report prepared for EPA entitled, "An Overview of Sediment Quality in the United Sates," the authors arrive at this sobering conclusion:

> "The overall magnitude of the problem in terms of areal extent and severity has not been assessed. The potential, however, is staggering given the historic use of our waterways as a disposal area and the fact that the United States has 39.4 million acres of lakes, 1.8 million miles of rivers, 32,000 square miles of estuaries*, 23,000 ocean coastline miles*, and hundreds of thousands of square miles of near-shore, continental shelf (marine) habitat. Even if only a small percentage were affected

with polluted sediments, it would represent a very significant problem."

(*excluding Alaska)

2. Environmental and Human Health Threats From Contaminated Sediments

Polluted in-place sediments affect at least two broad arenas: a. the aquatic environment, and resident or migratory fish and shellfish, birds and other animals; and, b. human health from foodchain and direct exposure. Obviously, different contaminated sites pose different threats, dependent on the extent, variety and toxicity of the pollutants. Some sites pose immediate threats to aquatic or animal health; others are suspected to contribute to, or cause, human health problems.

Contaminants in sediments are available to organisms either by remaining in place, or by being resuspended in the water column. In-place pollutants can be absorbed by bottom-living plants and then ingested by larger organisms. Contaminants can also be released from sediments by dredging and wind and wave action, thus re-entering the water column and becoming available for ingestion. Contaminants thus accumulate in the foodchain, stored in the tissues or organs of fish, shellfish, birds, animals and eventually, the predator at the top of the foodchain, humans.

a. Aquatic and Environmental Threats

The 1987 sediment overview study conducted for the EPA notes that, "it is not difficult to conceptualize a range of possible impacts on the aquatic biota deriving from polluted sediments." The 1989 National Research Council report discusses some of these impacts,

stating that "accumulation of contaminants in marine sediments can cause death, reproductive failure, growth impairment, or other detrimental changes in the organisms exposed to these contaminants. Such changes can impact not only individuals but also entire benthic (bottom-dwelling) populations and communities." Thus, impacts on two levels are widely experienced: on the individual organism and on the population as a whole.

Lethal, sublethal and chronic effects are experienced by individual organisms. Along with fish and wildlife kills, organisms experience skin lesions (so-called "fin rot"), tumors, liver problems, altered metabolism and strength, and altered behavior and reproductive habits. Deformities such as crossed bills in Great Lakes birds and holes in the shells of shellfish that live near ocean dumpsites where sediments are dumped, have been observed.

NOAA's National Status and Trends Program analyzes the concentration of pollutants in mussels at about 150 sites throughout the United States. According to July 1989 NOAA testimony, levels of metals, mercury, selenium and lead appear to be increasing nationally in the analyzed mussels. Looking at specific regions, NOAA found that, for example, the Hudson-Raritan estuary and other New York Bight sites showed increasing levels of chromium, copper, mercury, and nickel. In Mississippi Sound and in Marina Del Ray near Los Angeles, NOAA found that levels of DDT in mussels, <u>despite a ban on its use since 1973,</u> are actually increasing.

DDT contamination is notorious in California's Santa Monica Bay. According to the citizen group Heal the Bay, more than 1800 tons of

DDT flowed out of a local sewage treatment outfall onto the seabed for decades. It is estimated that the Bay sediments still contain roughly 200 tons of DDT, which continues to seep into the water and enter the foodchain. In fact, NOAA has recently filed a 60-day notice of intent to sue 16 companies -- including Montrose Chemical, then a manufacturer of DDT -- for their discharge and dumping practices in Southern California waters.

Sediment contamination is a major problem in the rivers leading into the Chesapeake Bay, and in portions of the Bay itself. According to a December 1989 report by the governmental organization the Chesapeake Executive Council, long-term comprehensive monitoring was initiated to assess sediment contamination throughout the Elizabeth River basin. The River was also a focus of a Virginia state marine pathology/toxicology research program. The report revealed that sediments from a site heavily contaminated with polycyclic aromatic hydrocarbons (PAH) proved to be highly toxic to fish exposed in the lab to various dilutions. The report concluded that "[these] results demonstrated the extreme toxicity of the pollutants in sediments" although their impact on organisms in actual riverine conditions was unclear.

Exposure to contaminated sediments can trigger entire population-scale impacts, including decreased population size, decreased reproduction potential, shorter average life span, and loss of habitat. In its 1989 report, "Great Lakes, Great Legacy?" The Conservation Foundation and The Institute for Research on Public Policy offered ominous evidence of population impacts from exposure to

contaminated sediments:

* Bald eagles along the shores of the Great Lakes do not reproduce as well as those that reside inland; in some lake areas, bald eagles do not reproduce at all.
* Such problems are not unique to bald eagles; other fish-eating birds and animals at the top of the food web have suffered marked developmental abnormalities that have resulted in significant increases in birth defects and population declines in some species.
* Many species of fish no longer survive in the waters of the lakes, and many of the survivors can no longer reproduce in situ.
* New varieties of fish have been introduced to replace the species destroyed by human activities. However, authorities warn that these new species should be eaten only in small quantities because they are contaminated with poisonous chemicals.

b. Human Health Threats

The 1989 National Research Council report pointed to "evidence that there may be substantial risk to the ecosystem and potentially to human health due to the contamination in marine sediments." The threats to human health, according to the report, are diverse: "in addition to the carcinogenic nature of many of these [sediment] contaminants, reproductive impairments and other sublethal effects in humans are concerns that require increased attention."

The 1987 sediment study commissioned by the EPA noted that "the most common responses to recognized sediment contamination problems have been the issuance of fishing bans, fish consumption advisories, bans on swimming and the closing of water supplies." The reason: fear of direct contact with contaminants, or the more common route of exposure -- ingestion of polluted fish and shellfish and the storage of those pollutants within the human body. Toxins found in fish and shellfish, and other wildlife exposed to contaminants from underwater

soils, include carcinogenic PCBs as well as the extremely toxic mercury, along with a host of other pollutants linked to various diseases or significant health problems.

When contaminants reach a certain concentration in edible fish (and testing or examination discovers contamination), bans or consumption advisories are sometimes put in place. The 1987 study found "numerous examples" of cases where fish consumption warnings or bans have been issued for fish laced with pollutants such as PCBs, mercury, dioxin and kepone "due to contaminated sediments affecting the food chain." Ingestion of contaminants can also come through irrigation water on food crops, or through drinking water. In one case, the study found, an alternative water supply was brought into the community because the water was contaminated by arsenic released from the sediments.

While it occurs far less frequently than exposure via the food chain, direct contact with contaminated sediments is possible, the 1987 report found, particularly by swimmers, divers and workpeople cleaning boat hulls.

The most disturbing impacts have been documented in Great Lakes residents. According to the National Research Council report, a study was conducted in 1976 on the exposure of humans to PCBs through the consumption of fish from Lake Michigan. Lake fishermen, who as a group consumed more than three times the national average of fish, showed an increase in PCB serum levels with the increased fish consumption. This data indicates that these Michigan residents were exposed through their diet to levels of PCBs significantly above those

for the average population.

A more recent study, done in 1984, points out some of the chilling health effects of consuming toxins through the food chain. The National Research Council report cited effects observed among infants born to mothers in "high fish consumption" categories, which included delays in developmental maturation at birth. The babies were also smaller in physical size, and had reduced head circumference and neuromuscular maturity. Because of these and other problems, these babies of mothers whose "sin" was to eat fish were classified by physicians to be within the "worrisome" neonatal category. The Council report states that these observations suggest "an effect of contaminants upon the centers of higher integration in infants secondarily exposed via maternal circulation." Yet harm to babies is not confined to when they are just in utero: they are also exposed to PCBs via breast milk if the mothers are unlucky enough to consume contaminated fish while nursing.

Indeed, fish and shellfish contamination from exposure to polluted underwater sediments is found throughout the United States. According to the January 26, 1990, "Environment Reporter," pollution discharges have caused genetic mutation in fish near Los Angeles Harbor and in other Southern California areas, prompting the Los Angeles County Health Department to post signs warning against eating fish from those areas. The March 30, 1990, "Environment Reporter" cited increased levels of dioxin in fish taken from Maine rivers, prompting Maine state officials to issue new warnings on fish consumption. The March 16, 1990, "Environment Reporter" cited a

directive from the Texas Water Commission to Dow Chemical asking it to conduct a year-long sampling to determine the dioxin level in fish caught near the company's point of discharge in the Brazos River.

Closer to home, the Chesapeake Executive Council reported that the District of Columbia issued a health advisory to consumers in 1989 because of high levels of PCBs and chlordane found in channel catfish, carp and eels from local waters. Sediment studies were initiated to determine the sources of the toxic materials.

Exposure to toxins has contributed to the decline of the fabled Chesapeake Bay oyster fishery. The Chesapeake Executive Council noted that the state of Maryland was to release a report in January 1990 summarizing data on levels of heavy metals and chlorinated huydrocarbons found in Chesapeake Bay oysters over a period of several years. The ten most heavily used pesticides in the state of Maryland were of particular interest.

The National Marine Fisheries Service reported earlier this month that bottom-dwelling fish in urban and industrial areas have high levels of contaminants that lead to a "high prevalence of cancerous liver tumors, as high as 24 percent in parts of [Washington's] Puget Sound and Boston Harbor." Almost 40 percent of the female English sole the Service tested from the Puget Sound area failed to mature sexually. In a May 1990 paper entitled, "National Trends in Habitat Degradation, Fishery Declines and NMFS' National Habitat Conservation Program," the Service found that "contaminants can constitute a kind of 'triple threat' to successful reproduction." First, normal egg maturation is inhibited; second, sexually mature fish are less likely

to spawn when induced in the laboratory if they were collected from contaminated sites; and third, adults from contaminated sites which do successfully spawn produce a high percentage of deformed larvae in comparison to those from cleaner areas."

Other animals and wildlife suffer from exposure to sediments, as well. According to the National Research Council report, a study conducted with rats concluded that PCBs derived from fish have an effect on the nervous system. Another study with mink indicated that PCBs derived from a fish diet have an effect on reproduction "at very low levels." The Los Angeles County Health Department has reported that dolphins and sea lions off Southern California have the highest concentrations of DDT and PCBs in their body fat of any marine mammals ever studied. Studies such as these led the National Research Council to conclude that, "overall, a limited number of studies have indicated that significant changes in health status may occur in humans consuming contaminated fish . . ." The Council report notes that "the findings with the PCBs add an additional dimension to the concern expressed after the Minamata, Japan, mercury poisoning incident in the 1950s." In this case, fish were shown to be the source of methylmercury exposure in humans seriously afflicted with neurological and other damage. Members of the subcommittee may recall the horrifying black-and-white photographs that were widely publicized of the children, some grown to adult, deformed by mercury poisoning while in utero.

As indicated, not just fish carry contaminants from sediments, and not just babies, mothers and fishermen are affected by these

toxins. In several cases, Great Lakes ducks -- widely hunted by sportsmen -- have been found to contain 60 times the level of PCB contamination as poultry sold in grocery stores.

3. Recommendations for Actions to Address Contaminated Underwater Sediments

The problem of contaminated underwater sediments cannot be ignored. The following six recommendations were endorsed by 235 international and national labor union, sporting, fishing, health and citizen organizations as vital first steps that must be taken if the United States is to come to grips with its polluted underwater lands. I would like to briefly outline these recommendations, focusing on the need to apply new and developing decontamination technologies to contaminated sediments. (For those interested in a more substantive discussion, the recommendations are described at length in the Citizens Charter, available from the Coast Alliance.)

1. The EPA has recently created a Contaminated Sediments Task Force, composed of representatives from offices within EPA. In order that it be presented with as much pertinent information as possible, this new EPA Task Force should convene a Federal Contaminated Sediments Inter-Agency Committee composed of experts from other federal agencies. This Federal Contaminated Sediments Inter-Agency Committee should advise the EPA's Contaminated Sediments Task Force. In turn, the EPA Task Force should develop national sediment quality criteria and standards that fully protect the health of the Great Lakes and marine coasts ecosystems affected by in-place sediments,k

and their disposal in Combined Disposal Facilities (CDFs) and at ocean dumpsites. The criteria should address chronic, acute, lethal and sublethal effects on the aquatic community -- including the benthic and pelagic communities -- and should consider bioavailable and bioaccumulative effects of contaminants in sediments. The impact of sediment contaminants on wildlife, and human health, should be addressed. These criteria should form the base for measuring point and non-point pollution controls; assessing the health of water bodies with particular attention paid to the benthic communities; and determining the impact of dredged material disposal on the Great Lakes and ocean dumpsites. At a minimum, $5 million for fiscal year 1991, and $10 million for fiscal years 1992, 1993, and 1994 should be authorized, and appropriated, to fund these activities. In addition, $25 million per year for five fiscal years should be authorized for grants to states for development, adoption and enforcement of sediment quality standards.

2. In order that aquatic ecosystems, and the important fisheries, wildlife and recreation values they support, be fully protected from toxic sediments, <u>open water disposal of contaminated sediments must not be allowed.</u> Under the current Marine Protection, Research and Sanctuaries Act (MPRSA, or the "Ocean Dumping Act"), material cannot be dumped that will adversely affect municipal water supplies, shellfish beds, wildlife, fisheries or recreational areas. Dumping materials that are found to be contaminated would, it follows, run counter to the purpose of the Ocean Dumping Act: the protection of human health or the marine environment, and the important economic

resources it sustains.

3. Methods to greatly increase implementation of source control, waste pretreatment and pollution prevention measures must be implemented. Non-point and point sources are major contributors to sediment contamination. The EPA's new Contaminated Sediments Task Force should develop a toxics source reduction strategy, with full opportunity for public review and comment, that includes improvements in pollution prevention, industrial pretreatment, and urban and agricultural runoff abatement programs.

4. EPA should use information from federal and state agencies, academic institutions, and public organizations to compile a national assessment of the extent of the problem of contaminated sediments. This survey should plot the extent of contamination in the Great Lakes, marine coastal areas, and major rivers. The survey should assess the effects from contaminated sediments on aquatic life, wildlife, and human health, and the pollutant loadings contributed by sediments to downstream waters, including the open water of the Great Lakes and the marine coasts.

5. A coordinated funding mechanism to pay for removal and clean-up of contaminated sediments must be created. Different financing mechanisms should be contemplated, including but not limited to: a) "user fees" or permit processing fees for harbor authorities, tonnage fees for shippers, discharge fees for shippers and other dischargers, water user fees for marinas and other commercial water users, and permit fees for firms contracted by the Corps, or private entities requesting Corps dredging operations; b) state and local

matching grants; c) fines levied against transportation and shipping industries for spills and other unintentional releases and discharges; d) court revenues received through liability claims and enforcement actions against Clean Water Act and Ocean Dumping Act violators; and, e) creation of a National Contaminanted Sediment Restoration Trust Fund financed, in all or in part, by the Harbor Maintenance Trust Fund.

6. A national program should be created, administered by the EPA, to direct the removal and clean-up of sediments. As part of this program, EPA should develop strategies and incentives that encourage the use of new and emerging technologies for sediment clean-up and remediation, including but not limited to biodegradation, and chemical and thermal treatment. Technologies that should be given priority attention are those that have already been, or are being, identified by EPA's Assessment and Remediation of Contaminated Seduiment (ARCS) program through EPA's Great Lakes National Program Office, and EPA's Superfund Innovative Technology Evaluation (SITE) program.

Some of the new treatment methods are of particular interest. Biodegradation uses fungi or microbes to attack complex organic compounds and metals. Solvent extraction processes involve the treatment of sediments with organic solvents to remove PCBs and other organics. The Basic Extractive Sludge Treatment Process uses a solvent to separate PCBs and other organics from sediments. Chemical Destruction of PCBs has been used to initiate a complex chemical reaction that removes chlorine from PCB molecules. The removal of contaminants from sediments must be the nation's goal in the short

term, while the prevention of new pollution must become both our long- and short- objective. (For a good discussion of treatment technologies and other sediment issues, see "A Citizen's Guide to Cleaning Up Contaminated Sediment," available from the Lake Michigan Federation, Chicago, IL.)

It is imperative that decontaminating technologies, and not just disposal technologies, be developed that can address polluted soils. To help address this need, EPA is holding a workshop in June on innovative technologies for treatment of contaminated sediments in Cincinnati, Ohio. Panels will be held on extraction technologies; low-energy solvent extraction processes; biological and chemical treatment; low temperature thermal, oxidation, and immobilization technologies, and other emerging treatments. The workshop is being jointly hosted by the EPA's ARCS and SITE programs.

Different EPA Regional offices, along with individual states, are developing, or supporting the development of, technologies that show promise for rendering contaminated soils less harmful or harmless. For example, EPA Region 5 is currently conducting a pilot study to evaluate bioremediation and other innovative technologies for the treatment of PCB-laced sediments at the Sheboygan River and Harbor Superfund site located in Sheboygan, Wisconsin. The site was included on the Superfund list in 1986. The principal contaminants include PCBs as high as 4500 parts per million, and various heavy metals in the river and harbor sediments. In another case, a 1985 amended consent decree involving EPA Region 5 directed U.S. Steel to dredge 50,000 cubic yards of contaminated sediment downstream from the steel

plant, and to dispose of it in a RCRA-approved landfill with a leachate collection and treatment system. Dredging began in November 1989 and will continue this spring.

In August 1989, the Bay Protection and Toxic Cleanup Program was signed into law in the state of California. This state is part of EPA's Region 9. The new 5-year program requires the California Water Resources Control Board to develop a Water Quality Control Plan for the state's bays and estuaries, develop a workplan for the development of sediment quality objectives, and create a consolidated data base of known or suspected toxic hotspots throughout the state's bays and estuaries. The budget for the first two years of the program is an estimated $2.5 million per year.

In EPA's Region 10, the state of Washington has developed draft sediment management standards which will be incorporated into the state administrative code. These standards will eventually be included in state water quality permits.

Work on a five year contaminated sediment project has already begun through the EPA's Great Lakes National Program Office (GLNPO). Five priority Areas of Concern have been targetted for attention: Sheboygan Harbor, WI; Saginaw Bay, MI; Ashtabula River, OH; Buffalo River, NY; and the Indiana Harbor and Ship Canal, IN. The purpose of these projects is to develop testing and assessment procedures at the five priority sites.

It is clear that options far beyond land or ocean dumping already exist, and are being developed. The new technologies that seek to decontaminate sediments deserve strong Congressional, and EPA,

support.

4. Legislation that Addresses Contaminated Sediments

Various bills have been introduced, and in some instances marked-up, that include components addressing different aspects of sediment contamination. The chairman of this subcommittee's bill, H.R. 4323, would take needed steps toward better understanding and addressing contaminated Great Lakes sediments. Rep. Studds' "Coastal Defense Initiative," H.R. 2647, includes a component requiring promulgation of sediment quality criteria for a list of priority pollutants. Part of that legislation, which was marked-up by the full House Merchant Marine and Fisheries Committee last month and referred to this committee, includes an amendment offered by Rep. Pallone that would require the EPA to develop a long-term management plan for New York-New Jersey harbor sediments, including pollution prevention techniques and the application of decontaminating technologies, as well as requiring 10 percent of Harbor sediments to be disposed of in non-ocean dumpsites. In the Senate, Sen. Mitchell's "Coastal Protection Act of 1990," S. 1178, includes an extensive section requiring, among other things, the promulgation of sediment quality criteria and standards and the creation of ocean dumpsite management plans. Sen. Moynihan has recently developed his "Great Lakes and Coastal Sediment Assessment and Restoration Act," which would require EPA to conduct a survey of contaminated sites, and to jointly undertake with the Army Corps of Engineers sediment restoration projects on targetted areas.

The Coast Alliance strongly endorses these legislative intitiatives. This Congress, and this year, presents unique

opportunities for better protecting the nation's coasts, and addressing pressing pollution issues that threaten our environment and our very health. Last month's Earthday celebrations showed the extraordinary interest that ordinary citizens have in cleaning up and preserving the environment. This interest must not be taken lightly. 1990 is a confluence of important events: an election year for Congress and many gubenatorial positions; a redistricting year; and the avowed "Year of the Environment." This committee is presented with the opportunity to move critically important legislation that would help address what is literally a crisis affecting our coasts. This committee is also presented with the opportunity to craft new, important measures that would complement other legislation and create an approach to coastal protection that is urgently needed. It is no exaggeration to state that citizens around the nation are ready and eager to help Congress craft solutions to our coastal crisis. The Coast Alliance joins these groups in standing ready to assist this committee in doing all that we can to revitalize and protect our vulnerable, immensely important, coasts.

Thank you for this opportunity to testify.

STATEMENT OF THE

NATIONAL ASSOCIATION OF DREDGING CONTRACTORS

ON

'CLEANING UP CONTAMINATED SEDIMENTS'

BY

MARK D. SICKLES

EXECUTIVE DIRECTOR

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES

OF THE

COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

UNITED STATES HOUSE OF REPRESENTATIVES

MAY 16, 1990

Good afternoon. My name is Mark Sickles. I am Executive Director of the National Association of Dredging Contractors, a trade association whose members are engaged in underwater excavation activity, primarily building and maintaining America's navigation system.

Mr. Chairman, thank you for this opportunity to testify before the Subcommittee on the important topic of contaminated sediments. My testimony will be brief and to the point. Although the proportion of highly contaminated underwater sediments found in the Nation's commercial navigation channels is relatively low and can be handled safely with prudent management, there are a number of documented sites outside of the channels that are in dire need of remedial action. In some places, the stabilization of these sites may eventually reduce the levels of contaminants that ultimately are found in the navigation channel. With fewer underwater sources of contamination, routine dredging necessary for the movement of domestic and international commerce is likely to be less controversial.

For all of us concerned about the maintenance of our critical navigation system, cleaning up "hot spots" should be a top priority. Not only would the immediate environment be improved, but the public will eventually be less inclined to view all underwater soil as "toxic sludge."

There are five points I would like to make regarding the development of a workable cleanup program.

First, we recommend the program focus all of its energy on resolving the environmental problem as cost effectively as possible with only secondary focus on finding the responsible polluter. Often, the Superfund program becomes bogged down

in allocating and assessing responsibility rather solving the problem at hand. Any new program should be structured, as much as possible, to avoid drawn out legal battles. As you know, it is hard enough to find the responsible party on land – it will be much harder under water.

Secondly, the program should incorporate enough flexibility to employ proven isolation techniques within the aquatic environment. The record demonstrates that subaqueous capping has been effective over time and that the caps have remained in place through violent storm events. Other more exotic remediation alternatives may provide destruction of the pollutants rather than permanent isloation from the biota, but the costs would be so astronomical that very few sites would ever be cleaned up.

Third, the Corps of Engineers is the right agency to direct this program in close consultation and coordination with EPA. With a national investment of well over $100 million in research over the years, and as a primary contractor for EPA's Superfund program, the Corps has acquired great expertise in contaminated soils management, both for underwater and land-based sites. "Piggy-backing" on the maintenance dredging program (remediating "hot spots" when a dredge is on site for navigational purposes), however, may or may not be a cost effective and workable solution. Although we support giving the Corps new authority, mandatory piggy-backing is fraught with potential problems. It could jeopardize moving forward with critical maintenance dredging projects until disputes are resolved and lawsuits are settled. Experience dictates that we can always expect some opposition to the regulatory agencies' preferred disposal solution for contaminated sediments.

Fourth, this program should not be financed by revenues generated from the Harbor Maintenance Trust Fund as proposed in S.2594. Although we realize that finding

a dedicated source of funds is probably needed to make any new program work, and assuming the harbor maintenance tax increase proposed by the President is enacted, the Trust Fund will contain only enough money to pay for the annual commercial navigation requirement. Futhermore, as a matter of equity, importers and exporters paying the tax are rarely associated with the source of contamination.

Fifth, and most importantly, we would like to respond to doubts which have been raised about the U.S. dredging industry's capability to utilize advanced technologies in response to the contaminated sediments problem. The National Academy of Science's Marine Board report – 'Contaminated Marine Sediments: Assessment and Remediation' – states that "because of legal (i.e., Jones Act) and practical restrictions that limit access to foreign-built vessels domestically, it may be difficult to secure access to this technology in the United States--except as equipment fitted onto U.S.-built vessels or supplied through U.S. subsidiaries of foreign dredging companies." The technologies in question are specially designed hydraulic cutterheads or mechanical clamshell devices which reduce dredging turbidity. The simple reason that superior foreign technology has been developed is the foreign demand for services. These are not technologies we cannot purchase or develop ourselves if given the opportunity to bid on the work and secure a reasonable return on investment. The Jones Act simply ensures that the hulls or superstructure of our vessels are built in U.S. shipyards.

In summation, NADCs members want to participate with the government in developing whatever solutions are warranted. Thank you for your attention. I would be happy to answer any questions.

STATEMENT OF THE

AMERICAN ASSOCIATION OF PORT AUTHORITIES

BY

ERIK STROMBERG

PRESIDENT

BEFORE THE

SUBCOMMITTEE ON WATER RESOURCES

OF THE

COMMITTEE ON PUBLIC WORKS AND TRANSPORTATION

UNITED STATES HOUSE OF REPRESENTATIVES

MAY 16, 1990

ON

SEDIMENT QUALITY AND CRITERIA

NAVIGABLE WATERS AND HARBORS

Good afternoon. My name is Erik Stromberg. I am President of the American Association of Port Authorities (AAPA). Founded in 1912, AAPA represents virtually all public seaport authorities and agencies in the United States. AAPA members are mandated by law to serve public purposes, primarily the facilitation of waterborne commerce and the consequent generation of local and regional economic growth. As public agencies, AAPA members share the public's interest in a clean environment while furthering our country's economic, international trade, and national security objectives.

Mr. Chairman, the public port industry commends you for your commitment to reducing pollution and to restoring the health of our coastal environment. Much remains to be done. According to the Environmental Protection Agency (EPA), most of the pollutants still entering our waterways are doing so legally. These pollutants adhere to sediments which eventually find their way into our harbors. In addition, there has been over the course of the past decades, pollutant loading in our harbors, both legally and illegally. As a result, public port authorities, although not the source of the problem, are put in the position of having to clean up the residues of others, often at tremendous expense. Clearly, seaports will be one of the many beneficiaries of a cleaner marine environment.

Ninety-five percent of the world's traded goods are transported in oceangoing vessels which require navigational access to and from U.S. markets. Because of natural siltation processes, there is really no alternative to dredging if port operations are to continue and if harbors are to be improved to handle the increased trade volumes expected in the coming decades. Dredging is indispensable to maintaining our waterborne transportation infrastructure.

Although less than five percent of all dredged material is seriously polluted, these contaminated sediments are often found near shipping berths where port authorities must dredge in order to gain access to the federal navigation channel. Navigation channels and harbors are often located in, or near, highly industrial urban centers and are subject to runoff and discharges from roads, freeways, residential development, as well as commercial and industrial sources. The removal of contaminated sediments constitutes a very serious management problem for the public port industry. We are, therefore, directly affected by any law or regulation addressing the relocation of bottom sediments in our navigable waters.

The Extent of the Problem

The extent of the problem of contaminated sediments depends ultimately on the definition of "contaminated." In any urban or industrial harbor, there are likely to be sediment constituents found in unnatural amounts. There are, in addition, "background" levels of contaminated sediments occurring naturally. These levels differ greatly from region to region, and harbor to harbor. We strongly believe that, in order to determine whether the level of these potential pollutants is causing harm to the environment, a case-by-case biological assessment is necessary. If the contaminated sediments at a site are shown to be causing significant environmental degradation, remedial actions should be taken.

Our overall national understanding of the scope of the problem, however, is incomplete. Because the vast majority of highly contaminated sediments are not found in navigation channels where the Corps or the ports routinely dredge, a large scale effort is needed to better define the problem as well as prioritize the areas obviously in need of remedial action.

There are proposals now pending before Congress that attempt to address this need. However, funding is typically the problem. We have serious concerns with the suggestion to use the Harbor Maintenance Trust Fund to support remediation outside of navigation channels. The Administration wants to triple the fee to cover 100 percent of the Corps' Operations and Maintenance (O&M) programs. We oppose such an increase, although we welcome the opportunity to better define O&M costs, which should include all sediment disposal options (ocean as well as upland) and long term management planning. Nonetheless, the uncharted and potentially large costs for remediation outside of navigation channels could easily overwhelm the Trust Fund account.

Highly contaminated sediments (Superfund quality) are rarely encountered in the national harbor maintenance program, but 10 to 15 million cubic yards of less contaminated sediments dredged annually for navigational purposes do require special care and handling. This usually consists of some type of isolation within the marine environment or behind dikes along a waterway. Enormous resources are expended by public port authorities and the federal government to characterize dredged sediments and to develop environmentally sound disposal solutions. In fact, the cost of regulatory compliance has skyrocketed -- in some instances, testing and analytical work has become more expensive than the dredging itself. These costs are reflective of the complicated testing involved.

The good news is that the Corps of Engineers and EPA are making progress on several fronts to improve the program and the characterization of dredged material. Several years in development, a draft of a new ecological sediment testing manual for ocean disposal, (the "Draft Ecological Evaluation of Proposed Discharge of Dredged Materials into Ocean Waters" or "green book") has recently been sent to the field for comment. Although this testing manual is likely to prove very expensive for ports, it also will produce the latest in scientifically defensible information. The information generated is biologically based and is site specific. Managerial decisions based on this ecological testing information are then made by the experts at the local and regional level.

It should be noted that the "green book" represents the latest development of a rigorous and evolving approach to the testing and management of dredged material. This program has been underway with intensive effort involving both the EPA and the Corps for over a decade, and it will continue beyond the "green book."

The Cause of the Problem

There are still too many partially controlled sources of pollution into U.S. waters, including approved point discharges. Although nonpoint sources are much harder to control and normally do not result in "hot spots," controlling them is essential to restoring and maintaining the overall health of our coastal and marine waters. If source reductions are not accomplished, it would do little good to clean up an area which continues to receive

contaminated sediments through natural siltation processes. The Corps of Engineers is the logical entity to be given the authority to clean up or otherwise stabilize through proven methodologies, areas affected by highly contaminated sediments causing continual environmental harm.

Paying for remedial action is obviously a problem. The Corps' already overburdened O&M account is not the place to look for funds, and the "polluter pay principle" is probably not widely applicable for underwater deposits. Finding the responsible parties for underwater pollution is even harder than finding responsible parties for multiple-user land-based Superfund sites. General revenues from federal, state and local government may be the only realistic funding solution for cleaning up "hot spots" in the near future.

Role of Port Authorities

Port authorities dredge ship berths and access channels to the federal ship channel. In order for the sediments to be moved to another site in the water, they must meet national criteria established by the EPA and the Corps as well as more specific regionally based federal criteria and state water quality standards. Sediments not meeting the requirements are isolated from the biota, if they are to be dredged at all.

In general, the public port industry has a role to play in actively promoting the need for effective pollution controls. Although that is easy to say, it is sometimes difficult as public agencies to criticize municipalities and regulatory agencies within the state for not doing a good enough job. Working actively behind the scenes may be more effective. Closer to home, ports are now paying keen attention to the operations of their marine terminals to ensure that they are operated with care and sensitivity to the environment.

The Adequacy of Existing Federal Programs

The principal shortcoming of federal programs for addressing contaminated sediments is the matter of funding. For the navigational dredging program, EPA and the Corps currently have adequate authority to control and manage contaminated sediments. These two agencies are moving forward with initiatives to better manage both clean and contaminated dredged material. This effort is embodied in the "green book," which was developed after literally years of consultation between EPA and the Corps. We welcome the improved working relationship between these two agencies as a positive step toward achieving more programmatic consistency and to build public confidence in the soundness of their dredged material disposal program.

Unfortunately, these improvements do not address the fact that there is inadequate funding and authority for the Corps to remediate highly contaminated sediments outside of navigation channels. A national program to assess and address this shortcoming would be welcome, provided it has the flexibility to incorporate regional solutions. At the same time, a new program which lacks funding and a commitment by Congress would be of limited utility. Indeed, the spotty record of Congress in funding vital aspects of the Clean Water Act, such as Section 319 (nonpoint source control provisions) already has exacerbated the sediments problem.

Alternatives to Ocean Disposal

Approximately 20 percent of all of dredged material is put in EPA-designated ocean disposal sites. All of the material placed in these sites passes EPA's ocean dumping criteria. With more sensitive and longer biological tests now going into effect, there may be less material going to the ocean, or less going there without being "capped" with totally clean material.

There are several disposal alternatives theoretically available for both clean and contaminated sediments: totally upland confined sites or unconfined areas; confined disposal facilities extending from shore into the water or totally surrounded by water; thin layer disposal over wide areas; open water placement in bays, rivers and estuaries; or, in the ocean. All disposal alternatives can potentially have adverse environmental impacts, but these impacts can be limited with good management practices. Some alternatives obviously should not be used for highly contaminated sediments. On the other hand, opportunities to use dredged material beneficially should be employed to the maximum extent possible, especially for the construction of coastal wetlands.

There are many factors that come into play when selecting disposal sites. For ports in major urban centers, upland alternatives are usually unavailable, especially if there are large annual volumes being removed. Building confined sites nearshore in any location threatens wetlands, and building containment structures in estuaries threatens productive shallow bay bottom (although it creates good waterfowl habitat). Open water disposal in relatively nonproductive, nondispersive deepwater sites is often found to be the best solution. If the material contains low levels of contamination, subaqueous "capping" is often used. Many open water disposal sites have been found to repopulate quickly, and increasingly, underwater habitat is being created intentionally.

Numerical Sediment Standards and Pending Legislation

There is pending before Congress legislation that would require the development of numerical sediment standards. Depending on how these standards are developed and used, they threaten to overturn the advances in direct biological testing that have been developed and refined over the past two decades. By mandating numerical criteria for decision-making purposes, "pass-fail" numbers would replace detailed site-specific analysis. Although the standards would be derived, at least theoretically, from biological effects data, the number of local environmental factors involved complicate matters enormously.

States that used numerical standards in the 1970's found them to be inflexible and unworkable, and subsequently adopted direct ecological testing. The states found that numerical standards led to simplistic determinations that are only tenuously related to biological impacts, have found naturally occurring concentrations of a substance to constitute "contamination," and are extremely limited in their scientific validity over wide areas. An arbitrary level of pollutant in one soil type in the marine environment does not have the same biological effect as the same level of that pollutant in another soil type. Criterion for one chemical in sediment cannot measure the interactive effects of the chemical with other chemicals in the sediment. Most important, research has demonstrated

that potential toxicants in low concentrations are quite often chemically and physically bonded to fine grained sediments, thus precluding their availability to organisms in the food chain.

One of the primary reasons numerical sediment standards are being proposed is the perceived need for nationwide consistency through the implementation of a standard that is easily applied and understood. AAPA is supportive of greater program consistency and is counting on the ongoing EPA regulatory revisions to provide it. On the other hand, using numerical sediment standards alone to make disposal decisions will merely achieve superficial program consistency at the expense of a sound environmental policy. It also would preempt the ongoing regulatory reform effort, as well as the last twenty years of internationally recognized scientific dredged material research, which is manifested in the London Dumping Convention. Numerical sediment criteria appear to be promising in certain areas and might be put to good use in site monitoring, research and for ecological assessment purposes. Their use in actually managing dredged material, however, can lead to unwise environmental and managerial decisions.

Despite the degree of difficulty involved, there are test methodologies under development which might produce numerical criteria that can pass scientific scrutiny (by actually substituting for direct effects-based tests). AAPA fully supports further research in this area. We would oppose, however, any effort to force the development and use of criteria on EPA as well as any effort to require the use of numerical criteria in dredged material management decision-making before the process is better developed to assure its validity.

Again, the misuse of criteria would reverse the steady progress we have made towards an environmentally, economically, and scientifically sound decision matrix for dredged material management. The regulatory procedures that exist under both the Clean Water Act and the Ocean Dumping Act have taken years to develop and are currently being revised to reflect the state-of-the-art. The revision is based on scientific research, practical experience and intergovernmental deliberations. The decision-making process under the EPA protocols may be somewhat more difficult to understand than a "pass-fail" number system, but it undoubtedly provides a superior method of assessing the impact on biota.

Management of the Dredged Material Program

Mr. Chairman, clearly the federal government's overall management of the dredging program -- both the Corps of Engineers' and EPA's -- can be improved. For example, resources are currently lacking for long-term dredged material disposal planning, for disposal site designation, and for site monitoring projects. AAPA welcomes the opportunity to work with you in these and other areas to help improve the program. We have the ability today to identify situations where contaminated sediments from the navigational dredging program are being mismanaged, and if so, correct them without delay.

To date, a demonstrated need for changing the legal arrangements and regulatory approach now employed in the field has not been established. We need to give the "green book" approach a chance to work and not fundamentally uproot an effort that has taken

decades to develop. Moreover, the appropriate agency, EPA, has the ultimate decision-making authority under both the Clean Water Act and the Ocean Dumping Act to prevent any unwise disposal action. The Corps, which has extensive scientific as well as managerial expertise in handling contaminated sediments, is integrally involved in the program, as it should be. In fact, in most cases, the Corps should be commended for satisfying all the tremendously varied regulatory and resource agency demands while still controlling the cost to the taxpayers.

Conclusion

In conclusion, sediments transported into the harbor by natural processes, where they fall out of the water column, sometimes contain contaminants. These sediments must be periodically dredged if ports are to continue to function. As the entities that must dredge in order to do business, public port authorities are left with the job of properly disposing of these contaminants. For this reason, AAPA members have a large stake in your efforts to end both point and nonpoint source pollution of our waterways and to reduce unnatural soil erosion. In our opinion, this is where scarce taxpayer resources should be concentrated. With much needed long-term planning and consistent application of environmental safeguards currently being utilized and refined, the detrimental impacts of all types of dredged material relocation can be rendered negligible. Thank you.

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